

LIME KILNS IN SASKATCHEWAN

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By

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ABSTRACT

Lime kiln use in Saskatchewan from the earliest days of European settlement was researched and documented. Remaining features were relocated and oral or documentary history was gathered. This information was put in context on the prairies in regard to early cooperative industries and employment, architectural traditions, commodities in demand, the generation of supporting industries and spatial patterning. These resulting data were then used to explore several research questions. Lime kilns were associated with early trail systems upon which the earliest European settlements were established due to projected railway routes and areas suitable for wheat agriculture. Most of the earliest architectural traditions in Saskatchewan required the use of lime because homesteaders - predominantly those from northern Europe and specifically the British Isles - were building with log, stone and gravel or rammed earth and needed and to have access to a lime kiln in the area. The skill and knowledge to build and burn successful kilns was transmitted either through those bringing the technological know-how with them from their country of origin or was adopted by new settlers arriving from the east or the south. These skills were also taught by Indian Agents to native people on reserves as a way to generate income. The construction and use of lime kilns is indicative of one of the earliest settlement industries in Saskatchewan and was usually a necessity for the establishment of built heritage.

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LIST OF DEFINITIONS

Cement - any of various calcined mixtures of clay and limestone, usually mixed with water and sand, gravel, etc., to form concrete, that are used as a building material.

Concrete - an artificial, stone-like material used for various structural purposes, made by mixing cement and various aggregates, such as sand, pebbles, gravel, or shale, with water and allowing the mixture to harden.

Lime - CaO , a white caustic alkaline substance consisting of calcium oxide, obtained by heating limestone.

Limestone - a sedimentary rock consisting predominantly of calcium carbonate, varieties of which are formed from the skeletons of marine microorganisms and coral: used as a building stone and in the manufacture of lime.

Mortar - a mixture of (slaked) lime or cement or a combination of both with sand and water, used as a bonding agent between bricks, stones, etc.

Plaster - a composition of (slaked) lime or gypsum, sand, water, and sometimes hair or other fiber, applied in a paste form to walls, ceilings, etc., and allowed to harden and dry.

Quicklime or Unslaked Lime - see "lime" - prior to the adding of water, or, slaking of lime (see "Slaked Lime")

Slaked Lime or Hydrated Lime - Ca(OH)_2 , a soft, white, crystalline, very slightly water-soluble powder, obtained by the action of water on lime: used chiefly in mortars, plasters, and cements.

Whitewash - a composition of (slaked) lime and water, used for whitening walls, woodwork, etc.

CHAPTER 1

INTRODUCTION

1.1 Brief Discussion of Thesis Topic

The study of lime kilns in Saskatchewan is the first step to a broader perspective on construction techniques seen in early architectural traditions. The source of lime as it relates to construction in Saskatchewan is rarely mentioned in literature, but in most cases we know for certain it was used frequently in many types of structures. Buildings such as log structures with plastered and whitewashed exteriors and interiors, as well as fieldstone, cement, and brick structures of every purpose and dimension all required lime. The remains of these lime-based architectural materials can still be seen on many structures from the time period of the early 1880s to the early and later 1900s. The knowledge and skill required to produce lime had either been learned in the European countries of origin of the early settlers, or had been transmitted by those frequenting the trails and transportation routes from the east.

In some cases, individuals or groups took on limestone burning as an industry ranging in size and intensity from small scale to large in order to meet the needs of themselves and their neighbors by providing a sought-after commodity to the surrounding community. Lime kilns were operated in Saskatchewan for a fairly short span of time - most kilns ceased production once the railway reached the area and lime from large scale producers such as those in Ontario, Manitoba and Alberta became readily available. Others were no longer used after the necessary raw materials in the immediate area were exhausted and the remaining were found too far afield to make the venture profitable.

From an archaeological perspective, these kilns are important examples of material culture. They can be studied and interpreted like other types of material culture, providing clues that may not be present in the historical record. These features are associated with early settlement activity and represent the fulfillment of several goals of new homesteaders. This research is another key to understanding the processes

involved in establishing what we now view as built heritage in Saskatchewan. Lime production aided in a developing economy by allowing those with minimal funds to engage in production and provision of a sought after commodity to a new market. The production of lime in Saskatchewan is a snapshot of early settlement industry and an indicator of how many settlers met their old world architectural requirements with locally available materials using knowledge transmitted from Europe.

1.2 Objectives

This research aims to answer several research questions. First, where were lime kilns located in Saskatchewan? Second, can patterning be discerned in the distribution of lime kilns and to what aspect of early EuroCanadian settlement might this be linked? Third, which diverse ethnic architectural traditions required lime and who was building the kilns to provide the lime? Fourth, what were the ways in which the knowledge and skill to successfully build and burn a kiln was transmitted? Fifth, what economic role did lime production play for early residents of the province?

1.3 Organization of Thesis Chapters

Within Chapter 1, Section 1.1 will introduce the topic with basic background information intended to clarify how and why lime was produced in Saskatchewan. Section 1.2 will touch on the objectives this research aims to cover.

Chapter 2, Section 2.1. provides background information on the process of lime burning. The history of the beginning of lime production in Canada, and how the knowledge arrived in Saskatchewan will be discussed in Section 2.2.

In Chapter 3, Section 3.1 will overview the study area where most lime kilns in Saskatchewan were located. Section 3.2 will describe the sites that were visited during field research, and available historic information, as well as other known sites which either no longer exist, or were not visited on research trips. Section 3.3 summarizes site characteristics.

Chapter 4, Section 4.1 begins with a discussion and Section 4.2 will discuss the population density and lime production in Saskatchewan.

In Chapter 5, Section 5.1 summarizes the conclusions reached through the course of this research. Section 5.2 will make suggestions regarding future work on the topic.

CHAPTER 2

BACKGROUND AND HISTORY OF LIME PRODUCTION

2.1 Background

Lime is a necessary ingredient required for several building techniques. It is mixed with water and sand to create a proper mortar, added to cement, and mixed with various amounts of water to create lime putty, plaster and whitewash. Early builders utilized brick, stone, log and cement or gravel, all of which had benefits and issues associated with use.

- Brick, although long lasting and fire retardant, was not readily available in Saskatchewan in the early settlement period and would have been fairly expensive to purchase once manufacturing in Saskatchewan began. It also required a fair amount of skill to successfully build with brick, although bricks would be easier for a single builder to use than wood timbers (Noble 1984:30).
- Stone was free and readily available; all one had to do is gather it from the fields which could be time and labour intensive. It was also long lasting, provided good insulation for both heat and cold and was fire retardant, but also required a specific set of skills to properly lay and mortar the stones (Noble 1984:32).
- Logs were readily available in the parklands but could be difficult for an individual to build with alone. Each notching technique required varying levels of skill and were usually based on preference of the builder. Logs were subject to rot depending on type of wood used and benefitted from a coating of lime plaster to protect and insulate. Size of the structure was often limited by size of the trees in the area.
- Concrete was greater in strength than brick or stone and would produce thinner walls. It was fireproof, kept out pests, provided good insulation for temperature and sound with little to no upkeep but was initially more expensive. It was not readily available in most areas until the railway arrived and required a lot of lumber to build forms to hold the concrete until it set (Noble 1984:140).

Limestone had to be heavily processed in order to transform it into lime. It had to be quarried from exposures or gathered as fieldstones or fossil oyster shells. Next, the limestone had to be burned at high temperatures in order to drive off carbon dioxide. This burning was executed in two types of kilns and the differences are determined by how and what materials were loaded into the main shaft of the kiln.

Flare kilns usually only burnt one batch at a time and the result was a single load of high quality lime. The limestone was broken into smaller pieces and loaded from the top. The kiln was fired from the bottom in a firebox with a stone or brick arch separating the fuel from the limestone (Lindsay 1975:8) (refer to Figure 3.3). The top of the lime kiln was often sealed with sod, mud, clay or brick to retain the heat in the kiln (Figure 2.1) with only a small hole remaining to allow gasses to escape. This type of kiln was preferred if the highest quality lime was desired as it kept the ash from the fuel separate from the lime, resulting in a purer product. Flare kilns would have to be reloaded with limestone and re-fired after the kiln was allowed to cool and lime removed.

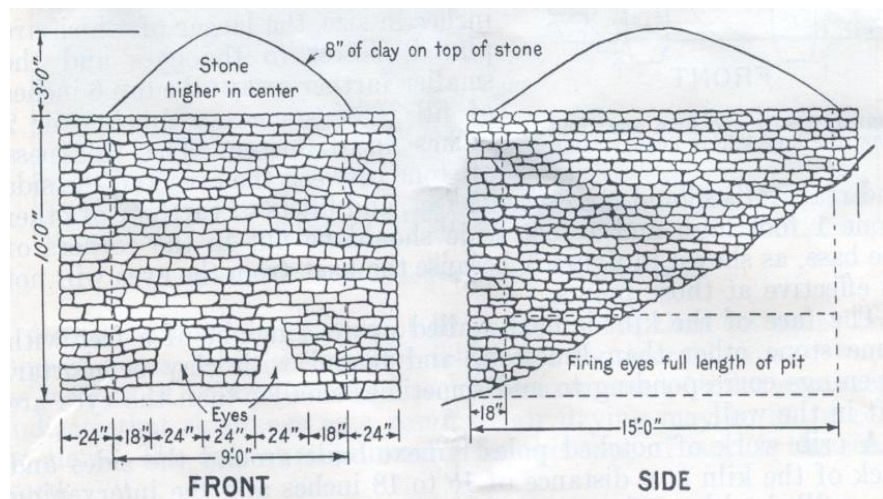


Figure 2.1: Side view of a flare kiln, 1938 (From *Making Lime on the Farm*, Farmers' Bulletin No. 1801, U.S. Department of Agriculture by N.A. Kessler 1938:15)

Running kilns (or draw kilns) could be used continually and repeatedly. They were loaded from the top with alternating layers of fuel and limestone (Figure 2.2). Running kilns were also fired from the bottom in a firebox. Draw holes allowed the lime to be removed as the load burned down and more fuel and limestone was added from the top (Lindsay 1975:8). Because the ash from the fuel was in direct contact with the

lime, this type of kiln produced a less pure product. This type of kiln was best however, if the main purpose was to create a lot of lime quickly to ready it in bulk for the seasonal market or for very large building projects.

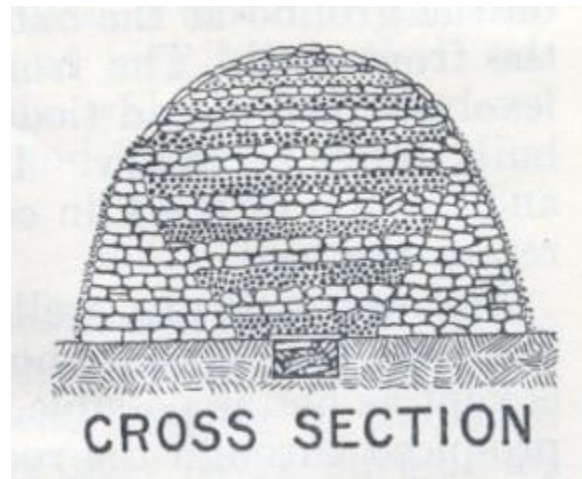


Figure 2.2: Side view of a running kiln, 1938 (From *Making Lime on the Farm*, Farmers' Bulletin No. 1801, U.S. Department of Agriculture by N.A. Kessler 1938:15)

Some individuals preferred to have the ash from the fuel incorporated into the lime and claimed that modern kilns fueled with gas or oil “produce a blander, less interesting and sometimes less effective final product because they do not contain the ashes of traditionally fired kilns” (Weismann and Bryce 2008:94). To include ash or not in the lime mixture seems to have been dictated by personal preference.

The burn time required by either type of kiln would vary. For flare kilns, the average time of a burn depending on size could vary from two to seven days. Different indicators were used to determine if the burn was complete, including the colour or height of the flame exiting from the top of the kiln. Running kilns could be burnt for much longer periods as the lime could be removed and more limestone and fuel could be loaded into the top. The only limiting factors would be the amount of raw materials, the labour available and the condition of the kiln structure.

Once the newly burnt lime (also known as quicklime or unslaked lime) had been allowed to cool, it had to be slaked immediately lest it re-absorb carbon dioxide from the atmosphere. Slaking is the process of adding the correct amount of water to quicklime and slowly mixing, working out the lumps and removing the pieces that did not properly

burn. Slaking had to be exact - the mixture could be weakened with too much water, or burned with too little water (Lindsay 1975:16). In order to slake lime, two-part slaking pits would have been used. The smaller, shallow part was used to mix the correct amount of lime and water and allow room for the mixture to expand. The resulting mixture would then flow into a larger holding area through a spout with some sort of grate to filter out large lumps of unburnt limestone.

The slaked lime would then be covered with sand to keep in the moisture and to ensure that the mixture would not absorb carbon dioxide until it was ready to be used. This mixture could be stored indefinitely or used immediately, although to produce a good lime plaster that did not continue to slake by absorbing moisture from the air once applied to the wall, the lime putty had to be aged for at least 3 months (Weissman and Bryce 2008:97). Slaking lime was extremely dangerous as the mixture expanded greatly and reached temperatures of up to 300 degrees centigrade (Lindsay 1975:15). Great care and expertise was needed to ensure a quality product at this stage of lime production as well.

Once the lime had been slaked to produce hydrated lime, it could then be used for building purposes. If mixed with sand and more water, mortar for building with stone and brick would be the product. If mixed with additional amounts of water, the resulting product would be lime plaster or lime whitewash depending on the amount of water added, both to be used as protective and insulating coatings on the interior and exterior of structures.

After the lime products were applied, the water began to evaporate which allowed carbon dioxide to be re-absorbed into the matrix. The process of the burning then adding water had to be done to make the limestone pliable enough to use. Once it had set, it had basically returned to its original limestone state.

The chemical process is summarized below and refers to the use of lime in mortar as an example (Lindsay 1975:6, Folk and Valastror Jr. 1976:203-204):

$\text{CaCO}_3 + \text{heat } (>900 \text{ degrees Celsius}) = \text{CaCO}_3 - \text{CO}_2 = \text{CaO}$ (quicklime)

$\text{CaO} + \text{H}_2\text{O} = \text{Ca}[\text{OH}]_2$ (hydrated or slaked lime) + sand = (mortar)

$\text{Ca}[\text{OH}]_2 - \text{H}_2\text{O} = \text{CaO}$ (loses water to evaporation)

$\text{CaO} + \text{CO}_2 = \text{CaCO}_3$ (absorbs CO_2 from environment, returning to limestone)

The process of burning limestone was labour intensive and risky at every step regardless of kiln type used. Carbon monoxide and smoke were other by-products of lime production, sometimes causing fainting, lung issues, and death. Severe burns could result from the firing itself and chemical burns from the contact of quicklime on moist skin. Lime was, however, a necessary building material for many, and producers went to great lengths in order to provide it to a market perpetually in need.

2.2 History of Lime Production in Canada

Lime has been produced around the world for use in everything from small scale craft items to large scale architectural structures for at least the past 8000 years. The production of lime in Canada began with the arrival of northern Europeans in the 18th century if not earlier.

Louisbourg was one of the earliest European settlements to be built in Canada. Founded by the French in 1713, it quickly grew from a fishing port to a heavily fortified town which the English and French fought over until it was destroyed by the English in 1758. A stone fortress of that magnitude required vast amounts of lime for mortar. When the French began burning limestone on the shores of Canada, there were already thousands of years of tradition and knowledge behind the skill and the process, but very little was known about the chemical processes at work and the chemical compositions of the materials which were being burnt (Lindsay 1975:6).

At Louisbourg, at least six small lime kilns existed to supply the fort with lime for

the ongoing construction in the area. When projects grew in magnitude and frequency, a larger lime kiln was required. The three, small, already existing kilns were quite far removed from the area where the lime was required and were deemed too small and too poorly built (Lindsay 1975:17) while other kilns had already been abandoned or destroyed. A flare kiln was built closer to the fortress prior to 1752 to provide the large amount of lime required by the additional construction of large projects at Louisbourg. After a master lime burner arrived from France in 1752 (Lindsay 1975:21), a larger and more efficient kiln was created by reconstructing the older flare kiln to become a running kiln in order to provide a steady supply of lime (Lindsay 1975:20). Although elaborate, this kiln was not in use for long. During a siege in 1758, the French destroyed the kiln by filling it with rubble and leveling the associated warehouses eliminating everything as a source of cover during the imminent battle (Lindsay 1975:20). British engineers continued with the destruction of the site after the last siege.

The production of lime moved west with European settlement in Canada. There is little information regarding lime production in Quebec. Mention of a lime kiln built near the Montmorency Falls on the Montmorency River before it flows into the St. Lawrence River exists in the description of the existing geological formations of the area from 1829. This kiln was built here to be near a source of limestone which occurred in great quantity closer to the falls (Baddedley 1828:185).

One can assume that in the early 1820s or even prior to, this would have been an ideal location for lime production due to the river valley, availability of good quality limestone, and proximity to markets and transportation routes. As of 1916, Quebec was the second highest producer of lime in the country with 21 firms employing 270 men and producing 1,498,845 bushels that year with a value of \$267,119 (Casey 1916:40).

According to Wayne Kenefick, President of the Canadian Lime Institute (personal communication 2013) lime kiln use in Ontario was a small scale industry and there are many small kilns scattered around Ontario. There were also large scale operators and kilns (Figure 2.3. and 2.4) as early as 1875 in Ontario, with mention of limestone quarries being worked for a century prior (Ontario Bureau of Industries 1889:384).



Figure 2.3: Lime Kiln, Rockwood (Ontario), 1933. (Courtesy of the Toronto Public Library, Toronto Reference Library, Baldwin Room, 968-5-28)



Figure 2.4: Deserted Lime Kiln, Rockwood (Ontario), 1933. (Courtesy of the Toronto Public Library, Toronto Reference Library, Baldwin Room, 968-5-30)

The Toronto Lime Company Works began operation after the arrival of the Grand Trunk Railway at Limehouse, Acton and Alton, Ontario and ran 15 kilns - both flare and running kilns for eight months of the year with an output of 210,000 bushels of lime annually (Ontario Bureau of Industries 1889:385).

Rock-View Lime Kilns were established along the Credit Valley Railway line near Milton, Ontario and utilized two running kilns built in 1881 and 1886 in the foot of a bluff. These two kilns were burnt from ten to eleven months of the year and produced 60,000 bushels of lime annually (Ontario Bureau of Industries 1889:385).

The Kelso Lime Kilns were also built along the Credit Valley Railway line near Milton, Ontario close to a limestone quarry which was almost exhausted by 1889. Two running kilns were built here in 1883 and 1886. A railway siding from the kilns to the main line was built for ease of transport (Ontario Bureau of Industries 1889:385-386).

Brown's Lime Kilns opened in 1883 with the construction of a flare kiln into Snider's Hill near Chalmer's quarry on Owen Sound. A running kiln was built in 1888 increasing the output to 30,000 bushels of lime in just seven months (Ontario Bureau of Industries 1889:386).

These businesses employed dozens of men - foremen, quarrymen, labourers, and firemen. All of these kilns had wood delivered to their operations to fuel the burns and required anywhere from four to 22 cords of wood per day at an average cost of \$1.70 a cord in the late 19th century. The main market for this product was Toronto, with some companies also shipping from ports at Georgian Bay, Lake Superior and the areas surrounding the kilns (Ontario Bureau of Industries 1889:386). By 1916 Ontario reported 37 firms employing 278 men and actively producing 2,031,396 bushels of lime a year with an annual value of \$367,115 (Casey 1916:40).

The Red River settlement in Manitoba was producing its own lime for construction purposes after 1811 due to the Scottish population and the ethnic tradition

of building with stone (Ingram 1971:80). The Hudson's Bay Company posts in the area also produced lime previous to, but most certainly after 1830 when the construction of Lower Fort Garry began, mostly out of locally sourced stone.

By 1861, Lower Fort Garry was providing the area with lime from its kilns and had established storage structures in order to have a supply on hand to meet the demand for architectural and agricultural purposes (Ingram 1971:80). No sources specify the type of kiln used prior to 1890, but after that year a kiln was operated on behalf of the Hudson's Bay Company by a Francis Philpott. This was a pot kiln, which was wide (5.4 m in diameter) and shallow (2.4 m deep) with no fire box dug in the bottom for stoking with fuel. Instead steel rails were used to separate the fuel from the limestone. In Francis Philpott's case, he was able to access steel rails from his previous job with the railway to create this separation (Ingram 1971:81). This particular kiln had been constructed previously by the Hudson's Bay Company. It had likely been refurbished by Philpott for further use and later reconstructed again as a flare kiln with an arch of limestone separating the fuel from the smaller pieces of limestone being burned and an added firebox (Chism 1972:75) to replace the need for steel rails. The lime from this kiln was sold to local residents for plaster and whitewash for 14 cents a bushel (Ingram 1971:81).

In the later settlement period in Manitoba, it was common for new immigrants to build their own kilns. When Robert Mountain purchased his farm "Valley View" on the Bird Tail River near Solsgirth, Manitoba in 1915, there were already two kilns on the property. The previous inhabitants who arrived from the British Isles dug the two, 3.6 m diameter kilns in to the side of the ravine in the years between 1890 and 1900. Although they were no longer in use when Robert took possession of the farm, he had known of the process previously - rocks were gathered from nearby fields and transported to the kiln site in a wagon. Trees were cut down near the ravine to fire the two kilns. Apparently the former owners were able to produce thousands of bushels of lime from burning these two kilns (Louisa Robertson, personal communication 2011).

Lime production in Saskatchewan arrived with the fur trade. There was a large

kiln operating at Cumberland House (Figure 2.5) during the fur trade which measured approximately 4.5 to 6 m in diameter and about 1.5 m deep. The limestone was quarried from a ridge of exposed limestone 32 km south of Cumberland House. According to a former resident of Cumberland House, these lime kilns were operated by the Hudson's Bay Company and the product was manufactured specifically for sale (Dennis Strom, personal communication 2011). Similar to the situation at Lower Fort Garry, these kilns likely provided the surrounding residents with lime for architectural purposes as well as filling the need for lime used to maintain Cumberland House.



Figure 2.5: 1960s aerial view of the remains of the lime kiln built at Cumberland House. (Used with permission of Saskatchewan Archives - R-C3211 - originally from Department of Parks and Renewable Resources)

After the fur trade period and into the early European settlement period, lime kilns were built and operated by those with the knowledge and skill to do so. They needed lime themselves and knew others also required it as a necessary building material. Many individuals undertook the time-consuming process of building a kiln, gathering the necessary materials, the dangerous and noxious task of burning and slaking, and finally the sale of the product.

In Alberta, especially in the southern portion of the province, the process of lime

burning was similar, but the raw materials varied. When George Frank Russell arrived from Scotland via Ottawa near Lethbridge as a land surveyor in the 1880s he noted several raw materials necessary to create lime for the cement house, barn and blacksmith shop he had planned - fossil oyster shells and coal (Alex Russell, personal communication 2011). He fired the kiln with coal as fuel instead of wood, and the main source of limestone was fossil oyster shells as well as glacial erratics of limestone available nearby. Once George had completed construction on his homestead he sold the remaining lime to the North-West Mounted Police to use as whitewash at their barracks (Frank Russell, personal communication 2011). George's descendants still live in the concrete house.

Lime kilns in British Columbia were common in the area in and around View Royal on Vancouver Island, which was an early industrial hub in the 1880s. The Atkins Brothers Silica and Lime Brick Company operated a lime kiln in order to provide their brick making operation with lime. The Atkins brothers ran this kiln (Figure 2.6) for many years, quarrying limestone from nearby sources and shipping the resulting lime and bricks made on site via rail and boat to where these materials were needed in construction (Stark 2008:2).

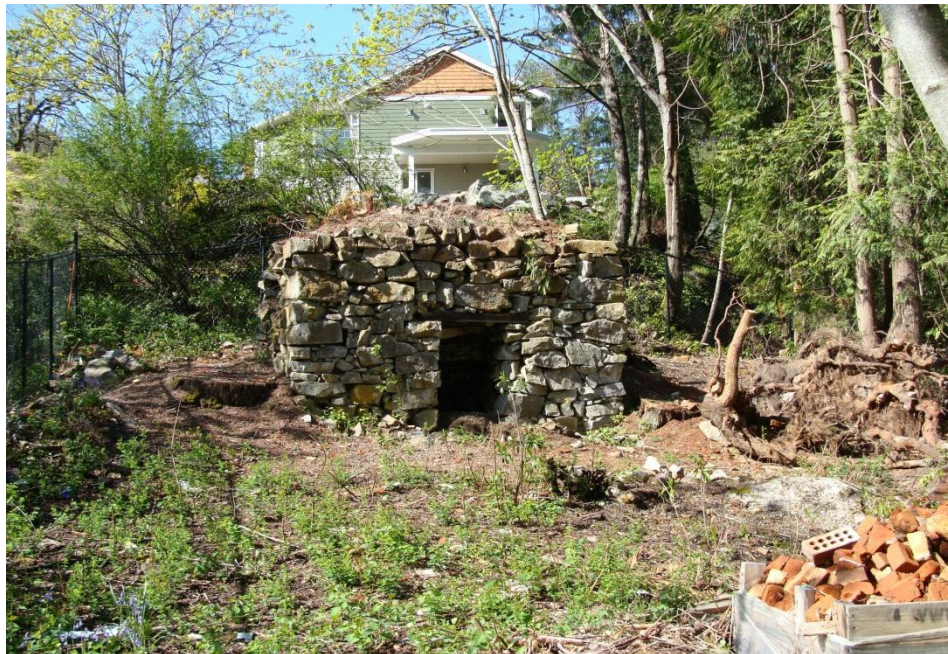


Figure 2.6: The Atkins Brothers lime kiln during restoration in View Royal, Victoria. (Photo by Lindsay A. Stokalko, April 22, 2013)

There were many other lime kilns in the area, most in use until about 1930 or until industrial activity on the shore ceased completely with the commencement of World War II when the Department of National Defence purchased the land (Duffus 2012).

Lime production occurred in a wave as those who originated from northern Europe made their way across Canada. As an industry, it appears consistently from the east to west coast as either small scale operations executed by a few individuals to meet their needs and the needs of their neighbors or large scale operations poised to transport tons of material long distances. By 1916, 84% of lime production still occurred in the eastern portion of Canada in Ontario, Quebec and the Maritime provinces (Casey 1916:39).

CHAPTER 3

SITE DESCRIPTIONS

3.1 Study Area

The area of study included where the remains of a lime kiln were known to the author, encompassing everywhere in the province of Saskatchewan. Limiting research to a particular area within the province would have provided too few sites and resulting data and would not have revealed the interesting patterns that emerged when all of the known kilns were mapped as they related to First Nations reserves and early European communities (Figure 3.1).

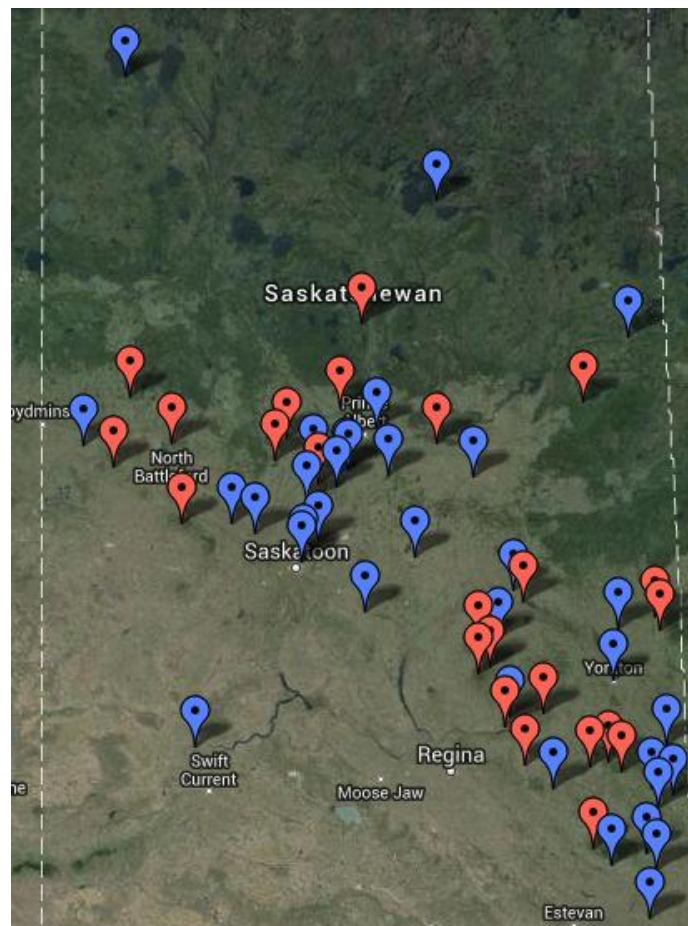


Figure 3.1: EuroCanadian (blue) and First Nations (red) communities associated with lime kilns, 2013 (Author's own data plotted using Google Maps).

3.2 Methodology

Extant and destroyed lime kilns in Saskatchewan were located in several ways. First, an interview with Diane Rogers from the Western Producer, and the resulting article published on June 9th, 2011 yielded many phone calls from across the province from individuals either with information about kiln use in the area, or those with the remains of kilns on their land. From this article seven separate kilns sites were recorded, viewed and photographed including at Birch Hills, Fielding, Arcola, Beckton Ranch (Parkman), Gerald and along the Pipestone Creek near Kelso. These sites were visited during the summer months of 2011 and 2012. Eleven other former kiln sites were recorded with information gleaned from others who had read the article. Articles were also placed in the Saskatchewan Archaeological Society and Manitoba Archaeological Society newsletters but neither of these attempts produced positive results.

Secondly, with the advice of Cliff Speer from CanoeSki Discovery Company and a map entitled *Historical Points of Interest Along the South Saskatchewan River* (St. Louis Historical Society 2005) suggested by Henry Begrand, three more kiln sites were located on the shores of the South Saskatchewan River from Batoche to St. Louis. This was done via canoe from August 26th to the 29th in 2011.

Third, information from Frank Korvemaker, a provincial archivist and architectural historian, resulted in many leads from the archives. Many connections were also made with individuals in communities with an interest in built heritage.

Fourth, the local history books belonging to communities with known lime production were scoured for information about industry, businesses and the families who were associated with lime production. Additional information about lime production and use on newly established First Nations Reserves was found in the Indian Affairs Annual Reports, 1864-1990 as suggested by Dale Russell.

If remains of a lime kiln still existed, effort was made to view and photograph the site. Kilns that were located in close proximity to other sites, those that were easily

accessible and those not previously recorded were given priority.

The lime kilns which were visited during research trips were photographed at the top of the shaft, the bottom of the shaft where the firebox was located and up the slope to show if the kiln had collapsed in on itself resulting in a slump. Any areas with pieces of broken limestone were also photographed, as were sections of broken and melted earth that once lined the interior of the shaft. Photographs of the surrounding topography and any existing buildings with evidence of lime use were also taken in order to provide context. The individuals who were kind enough to take the time to give us directions and allow us on their land were interviewed in order to record pertinent historical information or suggestions as to where to continue research.

All recorded lime kilns were mapped and labelled according to the community with which they were associated. This mapping revealed a pattern of lime kiln use in Saskatchewan. Almost all were located where the earliest settlements in Saskatchewan were established along already existing transportation routes which ran from the southeastern corner of Saskatchewan diagonally across to the northwestern corner following the aspen parklands/plains ecozone. Because the lime kilns were isolated along these swathes of earliest settlement, this was determined to be the study area. Four sites were found outside of this study area. In northern Saskatchewan there were three kilns near an undated cabin on the shore of Peter Pond Lake, a kiln associated with the mission at La Ronge and a later kiln on the shore of Lac La Ronge used briefly to provide lime for the construction of a new school in 1947, and a very large kiln associated with the Hudson's Bay post at Cumberland House. There was also one kiln in the southwestern area of Saskatchewan at Saskatchewan Landing. These were all of the lime kilns known to the author at the time of research, although certainly not a complete list of all the lime kilns in Saskatchewan.

According to the Saskatchewan Geological Society's Geological Highway Map of Saskatchewan (2002), limestone is only present in a select few southern areas in Saskatchewan - in Cypress Hills Provincial Park, near Cypress Lake, within the Cypress Hills, and moving east - on the shores of Lake of the Rivers by Assiniboia and further

south in the Big Muddy on the shores of Big Muddy Lake (Figure 3.2). Lime kilns in Saskatchewan do not seem to occur where there are limestone deposits

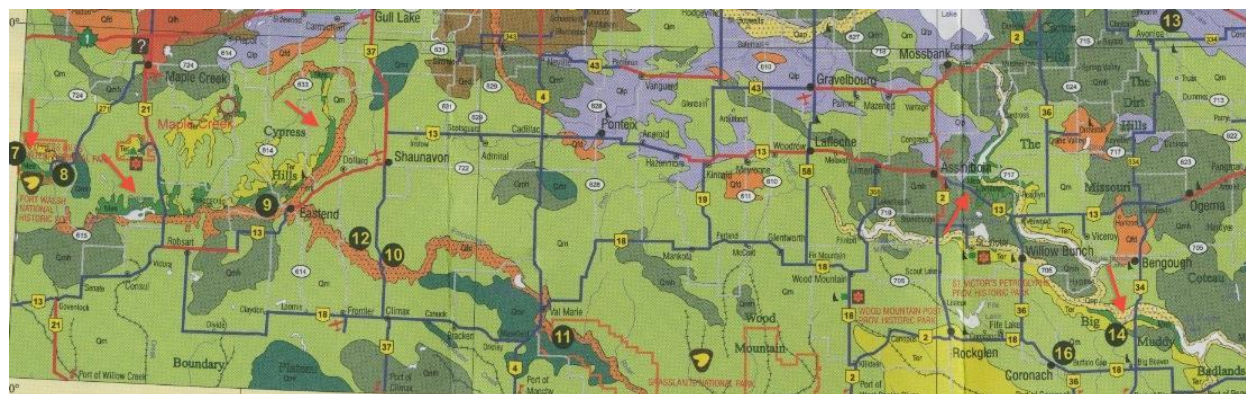


Figure 3.2: The kelly green deposits (indicated with red arrows) refer to shale, sandstone and minor limestone, 2002. (Courtesy of the Saskatchewan Geological Society, Geological Highway Map of Saskatchewan 1st Edition, Special Publication Number 15, 2002)

At the time that lime kilns were being constructed by early homesteaders, the populations of these areas were sparse. These limestone deposits may not have been readily accessible at the surface and could have been exceedingly difficult for one or a few people to quarry by hand. There may be lime kilns scattered in this area, although none are known to the author at this time.

These deposits developed during the Mesozoic along with shale and sandstone around 251 to 65 million years ago (Saskatchewan Geological Society 2002). The sources of limestone used by those who were building kilns were either deposits too small to be shown on geologic maps or were glacial erratics that were gathered from fields.

3.3 Site Descriptions and Related Histories

More than 50 lime kilns were discovered in Saskatchewan through the course of this research, varying from a slight mention in a document to still-existing but long abandoned structures. Most kilns were built into the side of a hill in order to save time, labour and building materials (Figure 3.3). Oftentimes this was in a river or creek valley as this was the most rolling terrain available. These areas were also the most heavily

treed and therefore provided enough fuel to fire the kilns.

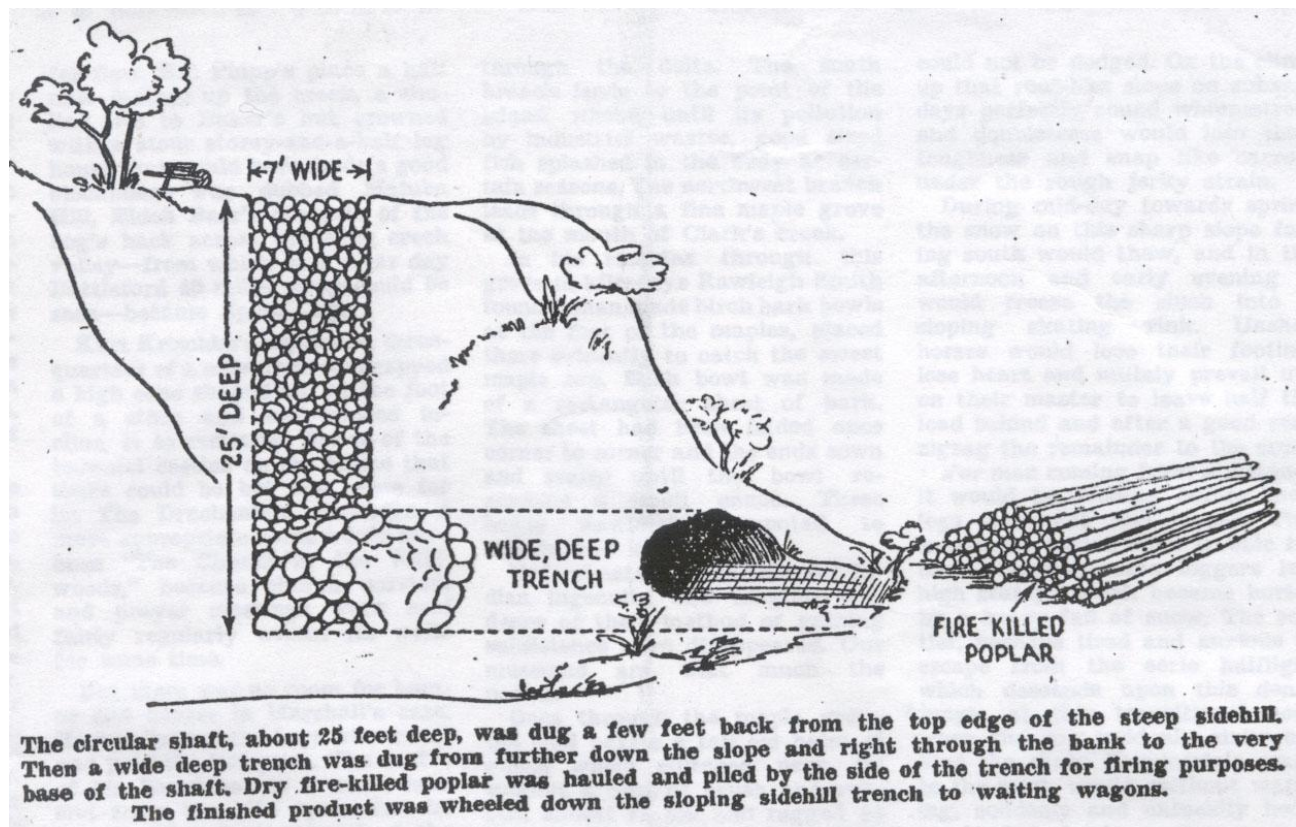


Figure 3.3: Side view of a flare kiln near Fielding, Saskatchewan, 1957. (Courtesy of T.L. Woodyard - originally from the Western Producer, October 17th, 1957, “The Kiln in Cree Country”)

The kilns described here were visited during the course of field research during the summers of 2011 and 2012. All photos were taken by Lindsay A. Stokalko unless otherwise noted. Kiln sites are organized according to the six Saskatchewan Association of Rural Municipalities (SARM) Divisions (Figure 3.4). This is done for heuristic and not historical reasons. Within each Division, sites are divided into “Sites Visited During Field Survey” and “Sites Not Physically Visited”. Under each of these sections, the sites are organized alphabetically and assigned a number that refers to Table 1. There were kiln sites found in every Division with the exception of Division 2 - South Central.

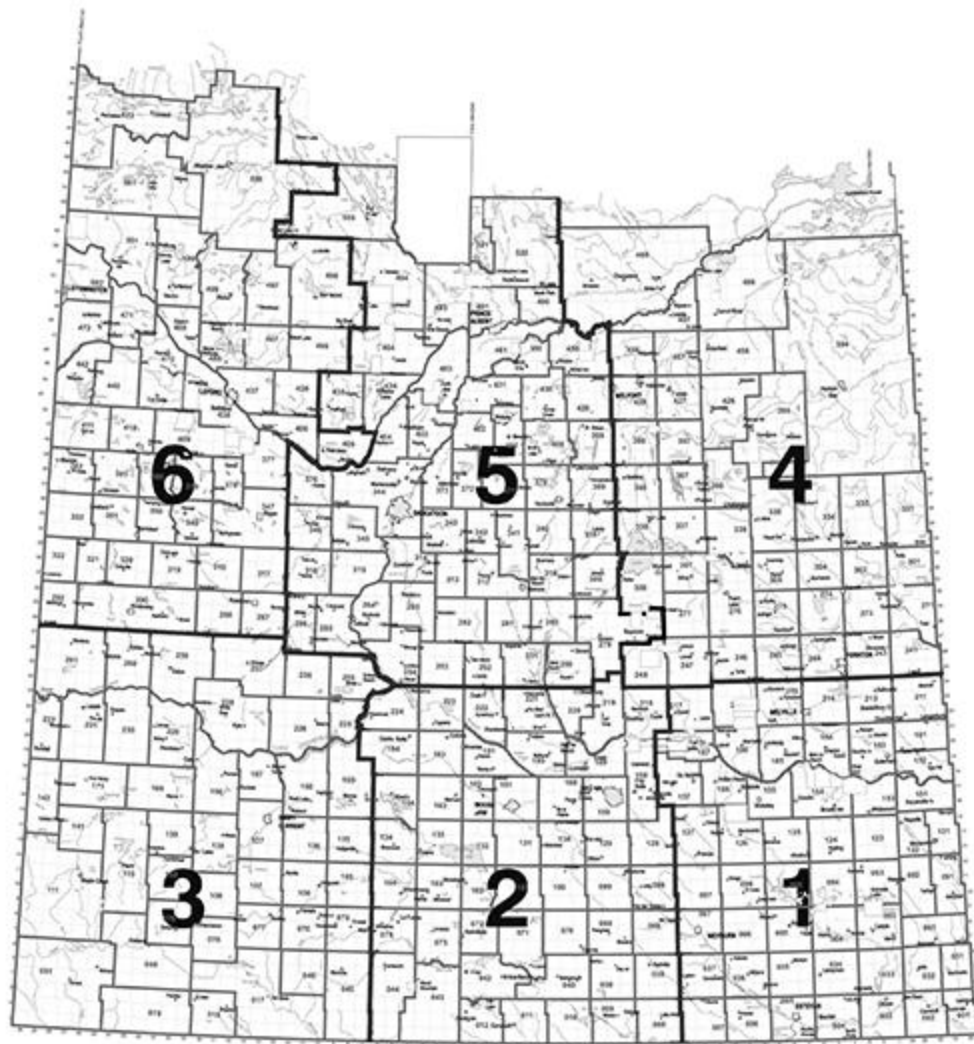


Figure 3.4: Saskatchewan Association of Rural Municipalities (SARM) Divisions: Division 1 - South East, Division 2 - South Central, Division 3 - South West, Division 4 - North East, Division 5 - North Central, Division 6 - North West, 2014. (Courtesy of The Saskatchewan Association of Rural Municipalities)

Division 1 – South East – Sites Visited During Field Survey

3.3.1 Arcola

North of the town of Arcola, at the very southern edge of the Moose Mountain hills, were the remains of five lime kilns built directly into the hillside (Figure 3.5). These kilns were built in 1883 by Thomas Hislop to provide lime for the gravel house he was planning to build. He was assisted by stonemason John Lees.



Figure 3.5: Remains of an Arcola area lime kiln with crushed limestone on either side, August 30, 2012

In “The Story of the Gravel House” as told by Thomas’ son William Thomas Hislop (no date), it is confirmed that five kilns were built to produce enough lime for the house. A kiln was built every other day and burned for four days. Each kiln yielded fifty bushels of lime. Due to the fact that they were building a kiln every other day in order to burn enough limestone for this building project, and the kilns were built with archways made of flat stones above the fire box in order to keep the wood ash away from the lime (whose collapse indicated that the burn was complete), we can assume they were flare kilns. The first kiln failed as the stone arch collapsed too soon during the burn, but the other four kilns burned successfully and provided enough lime to add to the gravel and sand mixture at a ratio of three gravel and sand to one lime.

The gravel was collected from along creek beds and the sand was found on the section to the south. Limestone was quarried out of the hilly areas and the wood required to burn the kilns (five wagon loads per kiln) was hauled from the Moose

Mountains (Unknown author 1965:20). The water required to combine the three materials was also taken from the nearby creek and the mixture was poured into wooden forms spaced 35 cm apart on top of a fieldstone foundation half a meter thick. All materials were locally available. The gravel house (Figure 3.6) was torn down in the late 1980s, and according to local residents, was still quite structurally sound prior to its loss.



Figure 3.6: Thomas Hislop's gravel house, built in 1883, 1986 (Courtesy of the South Saskatchewan Photo Museum - Adrian Paton, curator)

The other two houses in the immediate vicinity also required lime for their construction. A brick house (Figure 3.7) was built in 1904 from Estevan brick, possibly by John Lees who worked as a bricklayer in the area until 1917 (Arcola-Kisbey History Book Committee 1987:540).



Figure 3.7: John and Gloria Lees' brick house built in 1904, August 30, 2012

A well built fieldstone house and barn was built by John McEachen a few years earlier (Figures 3.8, 3.9 and 3.10). It is unclear if the lime for these structures was locally produced.



Figure 3.8: John McEachen's farm, 1958. (Courtesy of the South Saskatchewan Photo Museum - Adrian Paton, curator)



Figure 3.9: John McEachen's fieldstone house after a recent fire, August 30, 2012



Figure 3.10: John McEachen's fieldstone barn with a new metal roof, August 30, 2012

All five lime kilns in this area were viewed and photographed. All were very uniform in design - a similar shaft diameter of approximately 1.8 m and all built in to hills that were elevated approximately 4.8 meters from low lying areas and creek beds (Figure 3.11).



Figure 3.11: Kiln site in distance as seen from another kiln site, August 30, 2012

The five kilns in the area were surrounded by crushed limestone. There were three sites in total - two sites with two kilns each, built side by side - likely for ease of stoking the four day burn - and one site with a single kiln, which may have been the first, failed kiln.

3.3.2 Beckton Ranch (Parkman)

The lime kiln associated with Beckton Ranch and Cannington Manor is located east of Parkman near a seasonal water course on a slight ridge. This kiln is lined with fieldstone (Figure 3.12) which showed signs of being subjected to high heat due to the melted surfaces present on some of the stones (Figure 3.13).



Figure 3.12: Stone-lined lime kiln shaft from above, August 31, 2012



Figure 3.13: Melted stone inside the lime kiln shaft, August 31, 2012

This kiln has a larger shaft diameter than many of the other kilns that were viewed (approximately 3 m). It may have been built with a wider diameter due to the fact that the rise it was built into was not very high, thus creating a shallower shaft. The firebox could not be found, perhaps due to high seasonal creek waters. It was likely built in 1887 to provide lime for the construction of several fieldstone structures in the area - one of them being the Beckton ranch house (Figure 3.14) and horse stable (Figure 3.15).



Figure 3.14: “Didsbury house” on Beckton Ranch, 1930s (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs)



Figure 3.15: “Stable at Didsbury, 1897” on Beckton Ranch, 1897 (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs)

In a letter dated December 6th 1930 to a Mrs. Hewlett (one of the original resident founders of Cannington Manor) from Charles Pryce, the latter discussed his

work as a carpenter building structures at the village of Cannington Manor and Beckton Ranch (Figure 3.16).



Figure 3.16: “View of “Didsbury” stock farm” or Beckton Ranch, 1880s or 1890s (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs)

Pryce states that all other materials were hauled by oxen team from Moosomin, but the lime and fieldstone were gathered locally near Sutter Creek, which was 1.6 km east of the ranch site. This may be the creek where the kiln was located. Locally available poplar was cut down to fuel the kiln. Although this kiln appears to be built in to a lower ridge with much less of an incline, the topography is still consistent with other comparable kiln sites and this appeared to be the only incline in the area. It was also located very near to the building site and available poplar for fuel and water for slaking.

Since the village of Cannington Manor and the Beckton Ranch were abandoned shortly after their inception, this kiln may have been used only for a short period of time during the initial building frenzy. There were many other fieldstone houses and structures in the immediate area as well that would have also required lime, such as the house of the Pigott family (Figure 3.17), John Turton (Figure 3.18) the foundations for the mill (Figure 3.19), other structures at Cannington Manor, and various structures on the Hewlett homestead nearby (Figure 3.20) and countless others in the area.



Figure 3.17: “Mrs. Pigott’s house”, 1930s (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs)

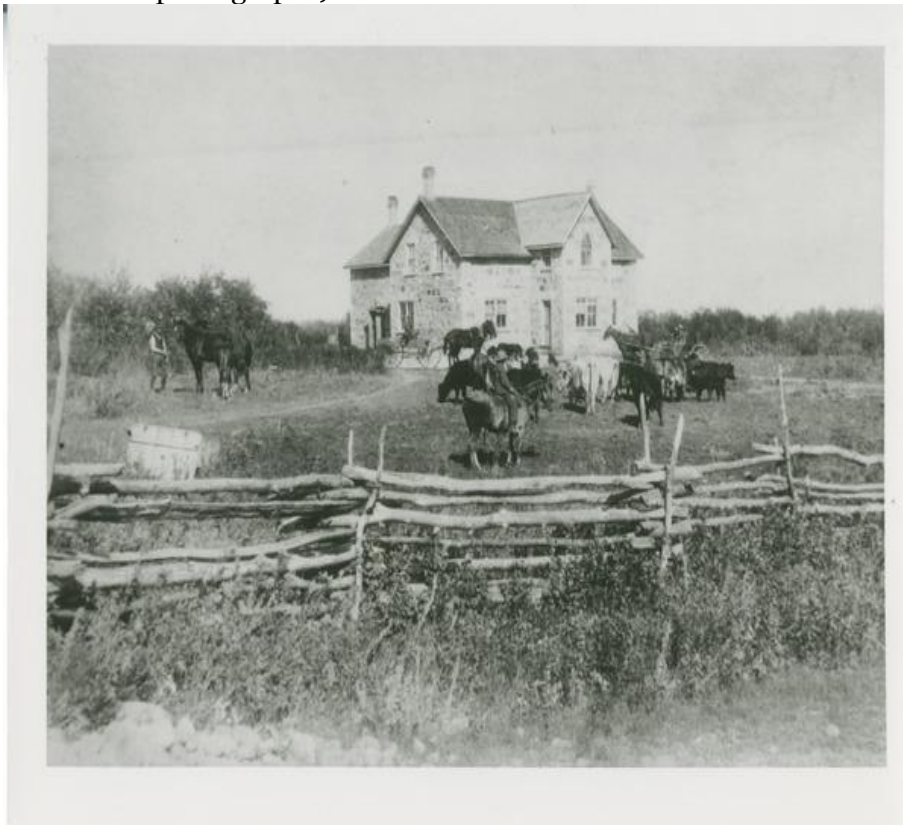


Figure 3.18: “John Turton House Cannington Manor built 1882-3”, 1880s (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs)



Figure 3.19: Fieldstone foundation of the mill at Cannington Manor, August 31, 2012



Figure 3.20: Fieldstone wall of a structure on the Hewlett homestead, August 31, 2012

3.3.3 *Gerald*

The last lime kiln site visited during the 2012 research trip was located along a creek in the Cut Arm Valley, on a steep hill near Gerald. This site was very disturbed - the only visible feature was a slight depression that was approximately 3 m in diameter at the top of the hill. There was no longer evidence of limestone or ash. The Cut Arm Creek flows at the base of the hill, and a road was under construction where an old trail used to run.

According to the local history book (George Hruska, personal communication 2012), this kiln was built and run in 1903 by the three Burnell brothers, who were bachelors from England. The brothers gathered the limestone from the area and the resulting lime from this kiln was used in the Burnell log home for the stone foundation and in the Redpath post office. The Burnells stopped burning lime shortly after the railway arrived at Melville and soon after passed through Gerald. The geography was also ideal for running a lime kiln - hillsides to build the kiln into, plenty of wood for fuel, fresh creek water for slaking, and a trail nearby.

3.3.4 *Pipestone Creek*

There are three lime kilns just north of Kelso along the Little Pipestone Creek. Two are located fairly close together on the Ekert property. The first is stone-lined (Figure 3.21) and does not appear to be associated with any crushed limestone. Some slumping had occurred when the shaft collapsed, but this kiln has a diameter of at least 2.4 m. The second lime kiln appears to be earthen with a smaller diameter, and associated with some crushed limestone (Figure 3.22). This kiln was very overgrown, collapsed and difficult to photograph.



Figure 3.21: Stone-lined kiln along the Little Pipestone Creek, August 31, 2012



Figure 3.22: Crushed limestone by earthen kiln along Little Pipestone Creek, August 31, 2012

The third kiln is located across the road on a neighboring property. This kiln is also stone-lined and associated with a large pile of crushed limestone (Figure 3.23). The diameter of this kiln was also approximately 2.4 m. Among the vast amounts of associated crushed limestone were several obvious fossils (Figure 3.24).



Figure 3.23: Stone-lined kiln with crushed limestone along the Little Pipestone Creek, August 31, 2012



Figure 3.24: Large piece of limestone with patterning consistent with fossilized coral, August 31, 2012

There is little historical information related to these three kilns, although they may have also been built to provide lime for the construction at Cannington Manor (Figure 3.25).



Figure 3.25: “View of Cannington Manor with the mill”, 1880s (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs)

The kilns are located at a halfway point between Cannington Manor and Moosomin, where other building materials were purchased and transported to the Cannington Manor site. The kilns were consistent in size and form (stone-lined) with the kiln near Beckton Ranch. The topography along the Little Pipestone Creek (Figure 3.26) was ideal for lime kilns including hills to dig vertical shafts and horizontal fireboxes into, wood for fuel, abundant outcrops of limestone and fresh water for slaking.

There were also many “skilled old country” stonemasons living in nearby Wapella in the 1890s who assisted in the fieldstone construction of the Christ Anglican Church in 1891 (Wapella History Book Committee 1979:40). The nearest source of lime at the time would have been from the kilns along the Little Pipestone Creek.



Figure 3.26: The Little Pipestone Creek valley as seen from second stone-lined kiln, August 31, 2012

A few years after Harold Symon's arrival from England prior to 1900, he built his family a fieldstone house with the assistance of a Scottish stonemason by the name of "Sutherland" (Wapella History Book Committee 1979:249). This construction would also have required high quality lime produced in the area.

Division 1 - South East – Sites Not Physically Visited

3.3.5 Duff

Lime required slaking prior to use and application. Also known as quicklime or unslaked lime; the resulting product from the kiln was mixed with the correct amounts of water in order to make it usable as a building material. Slaking is rarely mentioned in any of the literature or historical accounts, but there may be some physical evidence of lime slaking on a farm near Duff, Saskatchewan. This feature is approximately 1.2 m in diameter with baked clay walls 20 cm thick (Figure 3.27).



Figure 3.27: Possible slaking pit on Maurer farm near Duff, 2008. (Courtesy of Evelyn Siegfried, Royal Saskatchewan Museum)

The feature was discovered by Mark Maurer on the farm that had been in his family since the early 1880s. Such a feature was never mentioned by anyone or known by the later generations until a dog began digging up the deer and horse bones that had filled the feature, along with several large boulders below the layer of bones (Figure 3.28) (Evelyn Siegfried, personal communication 2011). The possible slaking pit is located 60 m from the Maurer home and was excavated in 2008. The 1.2 m circular feature may be the first part of a slaking pit where the lime was mixed with water and allowed to expand. There also appears to be a spout where the finished hydrated lime would flow to a larger holding pit. This feature was not excavated further than what is pictured in Figure 3.28, therefore it is unknown if there is a second rectangular pit below the spout. There is no known kiln associated with this feature.



Figure 3.28: Possible slaking pit on Maurer farm near Duff, 2008. (Courtesy of Evelyn Siegfried, Royal Saskatchewan Museum)

3.3.6 Glen Ewen

The remains of an earthen pit with nearby broken limestone are found` near the Souris River, southeast of Glen Ewen. There are also the ruins of a fieldstone barn foundation, a fieldstone house and a house constructed out of concrete blocks nearby. The Wallace family arrived from Ireland and built the fieldstone buildings, so it is likely that they also build the kiln in order to provide lime for the mortar. High water levels on

the Souris River have since filled in this lime kiln (Tarol Boyes, personal communication 2011).

3.3.7 Harmona

Another industrial attempt at lime burning occurred just east of Tantallon, Saskatchewan along Big Cut Arm Creek. A co-operative community called The Harmony Industrial Association moved west from Manitoba and began building their community in 1895 (Johnson 1978:81). By 1898 the colony was fully established in Saskatchewan with a population of approximately 50 people and amenities such as a laundry, community kitchen, blacksmith shop, carpentry shop, bunkhouses and lime kilns. These kilns were dug into the hills of the Qu'Appelle Valley and the resulting product was sold to the community of Moosomin for architectural purposes (Encyclopedia of Saskatchewan 2005:428).

Although the lime from the kilns certainly provided a certain amount of profit, the dangers and difficulty transporting unslaked and therefore volatile quicklime to surrounding communities certainly limited the success of the lime burning industry in this community (Johnson 1978:82). The undertaking, and eventually the co-operative community were both short-lived, ending in 1900.

3.3.8 Lipton

Brothers George and Tom Murray arrived from Ontario in 1881. After working as freight haulers during the Riel Resistance, both brothers filed for homesteads around Lipton. In 1884, the brothers discovered a limestone deposit near Tom's homestead. The brothers decided to build a kiln to process this limestone into lime for some major upcoming building projects in Regina, Fort Qu'Appelle and Lipton. According to Tom's granddaughter Orma Menzies (Cashman 1983), the kiln was built near the quarry site in the same coulee. Hard woods such as ash and aspen were preferred as fuel since they burned hotter and longer, allowing the kiln to reach the right temperature. The Murray brothers built a customized 35.5 cm deep wagon for the express purpose of delivering

their lime to customers. Menzies claimed that the lime from this kiln was used in the construction of Saskatchewan House, Glasgow House, the old Court House (Figure 3.29), and the RCMP barracks in Regina as well as the RCMP barracks in Fort Qu'Appelle and the Parklands Presbyterian Church located near Lipton whose walls still stood after it burnt down in 1887 (Cashman 1983). There was no mention of any smaller structures such as homes in the area.



Figure 3.29: “Court House, Regina” built with lime produced in Lipton, 1890s. (Courtesy of the University of Saskatchewan, Special Collections, Pamphlet Collection).

Judging by the date ranges of the buildings constructed using lime from this kiln, we can deduce that the Murray brothers ran this kiln for approximately ten years. Tom and George finally decided the kiln was no longer viable, but it wasn't for lack of resources or demand. Apparently it was crudely built and both Tom and George had been injured during the burning; George was burned badly and Tom had collapsed from the noxious fumes.

3.3.9 Moffat

The first stone house completed in Moffat was named Loganston (Figure 3.30) and was built by William Gibson beginning in 1884 and completed in 1885 (Parley 1994:56).



Figure 3.30: Loganston, built in 1884-1885 by stonemason William Gibson, 1886 (Used with permission of the Saskatchewan Archives - R-B2993)

William Gibson had worked as a stonemason in Ayreshire, Scotland and plied his trade on his homestead, building a stone house and barn (Parley 1994:17). According to Margaret Hryniuk (personal communication 2011), the limestone was gathered from the surrounding fields and burned in a kiln built into the hillside. This kiln was burned for 70 hours and the process was repeated after it had cooled and the lime had been removed for use, thus making it a flare kiln.

There were many other stone structures in Moffat, which had been settled almost entirely by people from Scotland. In addition to Loganston built by Gibson, there were 11 other homes, two churches and one school in Moffat and surrounding area (Hryniuk and Korvemaker 2009:32). These fieldstone structures were constructed by Gibson and two other stonemasons who settled near Moffat - William McCall and John Hutson (Hryniuk and Korvemaker 2009:33).

Gibson's Loganston is the only structure for which there seems to be information

regarding where the lime was produced. It can be surmised that William Gibson also burnt lime for others in the area, as he was known for his “unfailing affinity for Ayrshire men” and willingness to “search out men from home and get to know them” (Parley 1994:57), he was obviously more than willing to help. The other stonemasons could have also built and run kilns although no mention was found.

3.3.10 New Finland

Lime kilns were constructed in the New Finland area, just north of Wapella, by at least seven different men - Tahvo Kalmi, Mikko Myllymaki, John Saari, Salomon Petays, Kalle Katajamaki, John Kangas, and Toivo Koskela (Luhtala 1982:40). Their children assisted by gathering limestone from the recently broken fields and loading the stones into wagons. These kilns were flare kilns. Luhtala (1982:40) describes the process of loading the broken limestone from the top of the kiln which had been previously filled with wood to fuel the burn. The top was sealed to retain heat during the burn, and once cooled, the lime had to be carefully separated from the wood ash in order to maintain a high quality product. This also indicates that these kilns did not have an archway or rails within to keep the wood ash from mixing with the lime.

In New Finland, lime served several architectural purposes, namely in whitewash which brightened the small interiors of the log homes and acted as a disinfectant. It was also mixed with sand after it had been slaked to produce mortar for the construction of fieldstone buildings. Luhtala (1982:40) also mentions the role of lime in tanning where hides were soaked in a “lime solution” in order to loosen the hair prior to scraping.

Division 3 - South West – Sites Not Physically Visited

3.3.11 Saskatchewan Landing

Although this kiln is outside of the area where most of the examples covered in this thesis occur, it is related to a major freight and mail route which ran from Swift Current to North Battleford and thus bears similarities to those kilns located on major

trails.

The kiln at Saskatchewan Landing was built to provide lime for the stopping house Frank Goodwin decided to build out of local fieldstone in 1897. This structure was necessitated by so many freighters, and later, new settlers, getting held up at the frozen South Saskatchewan River due to poor crossing conditions. Goodwin had observed this as he escorted the mail as a member of the Royal Northwest Mounted Police (Cleasby and Lockman n.d.:1). He left his position with the Royal Northwest Mounted Police in 1885 when he married and took a job as postmaster in Swift Current. When Frank and his wife Mary decided to establish their home and ranch at Saskatchewan Landing, he hired local men to assist in the building of Goodwin House (Figure 3.31).



Figure 3.31: Goodwin House at Saskatchewan Landing, built in 1898, photographed in 1905 (Used with permission of the Saskatchewan Archives - R-A2279)

A Métis man by the name of LaRocque was hired to build and run the lime kiln (Hryniuk and Korvemaker 2009:40) and collect and prepare the raw materials. Construction began in 1898 with the assistance of stonemasons George and Henry Sherwood who came from Maple Creek (Frank Korvemaker, personal communication 2013). The sources claim that this lime kiln was burned for sixty days, which may be inaccurate. It may have been burned on and off for two months to keep a steady supply

of lime available for the masons, but burning one flare kiln for sixty days would most certainly result in unslakable lime. If it were a running kiln, it would still be a great feat requiring much labour and a vast amount of raw material to be constantly loaded and burned for sixty straight days. A house the size of Goodwin House very likely would not have required the amount of lime that sixty days of straight burning would produce.

The kiln was built in the same way as many other early settlement kilns common to the north and to the east, into the side of the hill near water and abundant fuel. It was constructed for the purpose of supplying lime for the construction of Goodwin House and seemingly not for sale elsewhere for any other architectural projects. Goodwin House still stands today (Figure 3.32) - a testament to the skill of the masons and the lime burners.



Figure 3.32: Goodwin House at Saskatchewan Landing as it stands today, circa 2010 (Courtesy of Robin and Arlene Karpan)

Division 4 - North East – Sites Not Physically Visited

3.3.12 Star City

William James Anderson and family decided to settle near Star City in 1900. The arrival of the railway in Prince Albert put William out of work. He had been freighting

between Prince Albert and Winnipeg via Batoche, Humboldt, and Pelly with ox-drawn Red River carts (Jubilee Editorial Committee 1955:137). Having built a log home with a large stone chimney for his family, he perhaps foresaw a market for lime in this area for plaster and mortar and continued burning the kiln he had built after completing his own home. This was especially fruitful after the establishment of a small brick yard in the area using the sand, clay and gravel discovered by the railway in 1903 (Jubilee Editorial Committee 1955:6, 120), when the demand for lime for use in mortar would increase.

Anderson's kiln was 2.4 m in diameter with a shaft 2.4 m deep with a covered archway over the entrance to the firebox (Jubilee Editorial Committee 1955:137). It was built by a nearby limestone outcrop which occurred near the surface and was easily quarried. The lime was carefully stacked inside the shaft to ensure heat would penetrate all of the pieces, and once loaded was covered with mud plaster to keep the heat in the kiln. It was fired for three days with partially burnt wood. Based on this description, this was a flare kiln. The stone, sand and possibly also the lime from Star City were used to build the first Presbyterian Church in Melfort (Jubilee Editorial Committee 1955:6), in addition to many other residences in the area.

3.3.13 Theodore

The experience of finding an abandoned homestead and lime kiln are described in a poetic recollection entitled "Lime Kiln" by Pearl Guest, who lived near Theodore, Saskatchewan:

...I began to ascend a small, steep hill that rose abruptly from the land.....Then, quite unexpectedly, I came upon an opening in the side of this hill, and realized that I had discovered an old lime kiln.

Through [sic] overgrown with weeds, I saw that the space leading to the kiln had once been cleared, and was strewn with small, broken stones. I walked to the base of the kiln. A low wall formed the foundation of the large opening, and on either side of this gap, the earthen sides rose up and curving in at the top, used to feed wood into the kiln. A large bowl had been excavated out of the side of the hill, and on the floor of this once fiery furnace, there still remained pieces of charred wood and lime-stones which had been burned to a white powdery lime. At the back and

upper part of this furnace bowl, another opening had been cut which served as a flue for the escaping smoke.

Contemplating this scene of former activity, I thought of the days and nights the young farmer had tended his fire, a length of time extending from ten days to two weeks, in order that his pioneer home in this new land, might also be one of beauty.

And as I turned and walked slowly away, I thought too of how, even as this changing season, the affairs of men change with commercial progress of the world. Lime kilns, such as this, are now but mute relics of a brave and adventurous past....[Guest n.d.]

She also speaks of finding broken pieces of “mortar” or chinking coated in whitewash still with the imprint on the log visible within the ruins of the foundation of a log house. Houses in the Theodore area (Figure 3.33) where many Ukrainian immigrants settled, were built out of logs and would have required a new coating of plaster and whitewash at least once annually. This meant the building of kilns and the burning of limestone was occurring in some frequency in the vicinity until these style of homes were abandoned for more “modern” frame houses.



Figure 3.33: “Theodore District” - Ukrainian homestead, 1920s (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs).

3.3.14 Wadena

When Pete Ericson arrived from Sweden to settle in Saskatchewan in 1903, he built a lime kiln in order to produce lime for mortar and plaster. The lime from this kiln was also used by neighbors to plaster the interior and exterior of their homes, as well as in mortar used for the stone foundation of a nearby hotel. The stones were hauled from the banks of Stony Creek. This kiln was stone-lined and was 0.6 m deep with a 1.8 m diameter and was similar in form to a pot kiln. It was fired for 3 days and 3 nights until it collapsed. Duane Peterson (personal communication 2011), said his grandfather Pete Ericson likely learned how to burn lime in Sweden. In later years, this kiln was destroyed by road construction.

3.3.15 Yorkton

J. J. Smith began homesteading in the Yorkton area in the early 1880s and soon made the switch to other industries (McCracken 1979:72). By the early 1890s he was operating a grist mill, a custom threshing business, a general store, a lime kiln (Figure 3.34), and a brick yard, employing well over 40 men from the community and surrounding area (Swallow 1955:52). The lime kiln in Yorkton was built on the outskirts of the newly established townsite. J. J. Smith began hiring men to scour the prairie for limestone which he may have noticed occurring in great abundance during his previous stock raising days (Swallow 1955:52). Wood from the Beaver Hills which was 56 km northeast of the townsite was cut, gathered, and transported to Yorkton to fire the kiln. Most lime kilns in Saskatchewan were not built with brick but earth, or lined with fieldstone, but the one built in Yorkton appears to be at least partially made of brick. This was perhaps the most readily available material for J. J. Smith as he was already running a brick yard by the time he built his lime kiln. The lime and brick produced by J. J. Smith's efforts contributed building materials for many of Yorkton's early buildings.



Figure 3.34: J.J. Smith's lime kiln in Yorkton built partially out of brick, early 1900s (Used with permission of the Saskatchewan Archives R-A4353)

Division 5 - North Central – Sites Visited During Field Survey

3.3.16 Batoche

The remains of crushed limestone (Figure 3.35) can be seen downstream from Batoche near the rifle pits on the east shore of the South Saskatchewan River and are indicated on the St. Louis Historical Society map entitled “Historical Points of Interest Along the South Saskatchewan River” (2005). The crushed limestone is located at the edge of a steep embankment in a disturbed and much frequented area of the river near a boat launch. The crushed limestone, is the only evidence of lime burning, in the immediate vicinity, although this type of topography would have been ideal for the construction of a lime kiln. It is possible that the actual kiln would have been impacted in years of high water or other disturbances (Figure 3.36).



Figure 3.35: Crushed limestone on bank of South Saskatchewan River, August 28, 2011



Figure 3.36: Site of crushed limestone as seen from water, August 28, 2011

Judging from the architectural remains of some of the original buildings at Batoche, such as fieldstone foundations, it is certain that lime was used and likely being produced nearby for local use. Downstream from Batoche along the South Saskatchewan River, other architectural evidence of lime use was noted. The interior of a saddle-notched log home had once been completely plastered and whitewashed with lime plaster over a rougher chinking of clay and chopped hay (Figure 3.37). Remnants of wallpaper were also still present. Much of the lime plaster from the interior had flaked off the walls and was still identifiable on the floor of the home. The exterior of this log home also appeared to have been given the same treatment of clay and chopped hay chinking although evidence of lime plaster and whitewash was no longer present. Most of the chinking had also disappeared save for the areas on the structure that are protected by the roof overhang (Figure 3.38). Other log homes were noted along the South Saskatchewan River, but this was the only one with evidence of lime plaster and whitewash that was observed directly.



Figure 3.37: Lime plaster still present on interior walls, August 28, 2011



Figure 3.38: Chinking still present under roof overhang - no whitewash, August 28, 2011

3.3.17 Birch Hills

Although the lime kiln south of Birch Hills had been destroyed years ago due to high water, the site where it formerly stood was still visited after interviewing Ernest Fisher in June of 2011. The site was located across the road from the original Fisher homestead just north of Jumping Lake in a steep ravine. According to Ernest Fisher Jr. (personal communication 2011) whose father and two uncles had built the kiln in the late 1900s after their first kiln collapsed, this one was dug 3 m down into the ravine with a trench at the bottom to act as a firebox and a 1.8 m wide opening at the top. The earthen walls of the kiln eventually baked solid, further strengthening the structure against collapse.

The limestone was gathered from the surrounding fields and transported with oxen and stoneboats to the kiln site and loaded into the top of the kiln. The white

limestone was preferred over the yellow (Figure 3.39) as it produced a better quality lime (Ernest Fisher Jr., personal communication 2011).



Figure 3.39: White limestone (left) was preferred over yellow limestone (right), June 18, 2011

Wood was cut from the well-treed surrounding area to fuel the kiln for the required three days and three nights of burning. The three Fisher brothers constantly supervised the firing during this time until a 3 m flame out the top of the kiln indicated the burn was complete. It was then allowed to cool before the lime was removed.

Ernest Fisher Sr., who had been a gardener in England before he immigrated to the Birch Hills area via Portage la Prairie, had learned the process of burning lime from a Métis man. The lime was sold for \$1 a bushel and its availability was announced through word of mouth. More than one bushel of lime was required to plaster one home as a means of insulating by filling the gaps in between logs, and most people in the area

had built log homes due to the availability of wood as a building material. Therefore lime was in high demand. Ernest and his brothers ran this kiln every fall for three years to ensure people in the area had a supply of lime to re-plaster and whitewash their log homes before winter. Once people had begun building “better” frame houses (Ernest Fisher Jr., personal communication 2011) there was no longer a demand for lime and the Fisher brothers ceased running their kiln. This kiln was likely a flare kiln as Ernest Fisher Jr. indicated that the lime at the bottom of the kiln was carefully separated from the wood ash and discarded as it was too baked and too tainted with wood ash for use.

3.3.18 Nisbet Forest

The remains of two Depression-era lime kilns built by the Seeley Brothers were indicated to exist on a bend of the South Saskatchewan River in the Nisbet Forest Reserve, on the “Historical Points of Interest Along the South Saskatchewan River” map (St. Louis Historical Society 2005). The topography is consistent with the landforms on which other kilns along the river were located. There was an abundance of good quality limestone on the clearing between the river and the ridge. The two kilns could not be relocated and had possibly been impacted or destroyed by activity as this area was highly disturbed due to ATV trails.

3.3.19 Sequin Creek

There is little historical information associated with the kiln at Sequin Creek. It is located high up on the river bank just downstream from Sequin Creek on the shore of the South Saskatchewan River (St. Louis Historical Society 2005). Due to the nature of the soil in this area, and the high temperatures achieved during the burning, the interior of the kiln shaft had baked into a green glass and a red clay and still had evidence of the limestone that was burned within (Figure 3.40). The shaft of the kiln is approximately 1.8 m in diameter (Figure 3.41). The trench at the bottom of the 4.5 m tall bank had collapsed, creating a faint slumping on the river bank. There was evidence of lime and ash present at the bottom of the bank where the firebox would have been. This kiln was the best preserved example of a lime kiln seen during the research project.



Figure 3.40: Sandy soil along river baked into a green glass on interior walls of kiln, August 29, 2011



Figure 3.41: Shaft diameter of approximately 1.8 meters, August 29, 2011

Division 5 - North Central - Sites Not Physically Visited

3.3.20 *Clark's Crossing*

The two lime kilns at Clark's Crossing had been found recorded prior to two reports commissioned by the Meewasin Valley Authority (Stantec Consulting Ltd. 2002; Weinbender 2002). One kiln is stone lined and measures 3 m in diameter and 3 m deep and was built along a ravine (Weinbender 2002:32-33). The other kiln is 1.5 m in diameter and was dug into the side of a ravine and was not lined with stone.

It is difficult to attribute each kiln to a specific builder. Perhaps J.P. Lake built the stone-lined kiln in preparation for the construction of the stone house (Figure 3.42) and barn in 1884. Lake may have cooperatively built it with J.F. Clark as the smaller earthen kiln also located on his property may not have provided enough lime to use in mortar.



Figure 3.42: Mr. and Mrs. J.F. Clark in front of the remains of the J.F. Lake house, 1934 (Used with permission of the Saskatoon Public Library Local History Room - lh-4283)

Another lime kiln was also mentioned to have been built on the west side of the river by James D. Caswell after his arrival from Ontario via North Battleford in 1886 to supply lime for a concrete house he had planned to build (Weinbender 2002:16), although no kiln in the area can be attributed to him. James and Frankie Caswell built a log house out of poplar in 1887, making sure to plaster and whitewash for insulation (Weinbender 2002:23). They most likely procured the lime they required for whitewash from one of the kilns in the vicinity.

Fieldstone and concrete houses and plastered and whitewashed log homes were built by homesteaders in this area due to a readily available supply of limestone nearby and lack of lumber. Several limestone outcrops are close, but the one showing the most evidence of quarrying activity is near frequented trails (Stantec Consulting Ltd. 2002:4.15). This outcrop was located approximately 180 m from the kilns along the ravine. Limestone was also abundant in the fields in the form of large boulders. Here, like many of the other kiln sites, we also see the key ingredients for producing lime found together: limestone, wood for fuel, hilly topography and proximity to trails.

3.3.21 Peturrson's Ravine (FbNp-73)

The lime kilns near Peturrson's Ravine were built along the South Saskatchewan River and date to the earliest building period of Saskatoon in the late 1880s. These two kilns were stone lined (Figure 3.43) and measured approximately 1.8 m in diameter with a depth of approximately 3 m (Champ 1991:1). Some of the earliest buildings of permanence in Saskatoon were built of fieldstone due to lack of lumber: Garrison House (hotel) in 1886, the Kusch house in the late 1880's, the Victoria School House in 1887 (Figure 3.44) and the Queen's Hotel in the early 1890's (Champ 1991:4). All would have required lime to create a proper mortar.

The location of these kilns was also associated with a major trail, the Batoche Trail which ran through the area where limestone outcrops were being quarried to supply the kilns. These outcrops had been noted by Henry Youle Hind, a geologist who passed through the area in 1858 (Champ 1991:2).



Figure 3.43: One of the stone-lined kilns at Peturrson's Ravine, 2009. (From Saskatoon Sun, photograph by Butch Amundson, 2009)



Figure 3.44: The Victoria School House, built in 1887, photographed 1888 (Courtesy of University of the Saskatchewan, Special Collections, A.S. Morton photographs)

Stonemasons began arriving in the area after hearing of an impending building boom and a lack of lumber. W.P. Bate an early resident of Saskatoon, stated that “many a tax bill in arrears was probably ‘worked out’ in hauling materials from deposits discovered on the prairie, limestone for the kilns, dry wood for burning the lime, granite boulders for the wall...” for the Victoria School House (Champ 1991:5). The process of building with fieldstone was time and labour intensive and it seems that the Temperance Colonization Society Board drew from a pool of people laboured to gather the materials required to build the first school in the area and so fulfilled their tax obligations. When the railway arrived in Saskatoon in 1890, so did commercially produced lime from Manitoba, which was later sold by merchants such as R.B. Irvine & Co. on Broadway Avenue who advertised “Lime, Lumber, Coal & Wood” (Figure 3.45) from 1906 to 1912.



Figure 3.45: R.B. Irvine & Co. in Saskatoon sold “Lime, Lumber, Coal & Wood”, late 1900s (Used with permission of the Saskatoon Public Library, Local History Room - lh1187)

3.3.22 Prince Albert

The Byrne brothers (Charlie and Andrew) arrived east of Prince Albert from Ireland in the 1890s. In order to provide whitewash for their own home as well as the homes of their neighbors, they built a lime kiln into the side of a riverbank where they found an exposure of limestone they were able to quarry. The hole that was a result of the quarrying was then used as the kiln. They broke up the larger pieces of limestone prior to loading them into the kiln and used wood from the river valley as fuel. This kiln was fired for a little more than a week (Marvin Byrne, personal communication 2011). What remains of the kiln after ice destroyed part of the structure can still be seen on the South Saskatchewan River in the Byrne family pasture.

3.3.23 Rosthern

Otto S. Blume, a native of Dodge City, Wisconsin made the move to Saskatchewan with his family on May 5th 1899. By 1904 he had purchased a quarter-section of land from George Lovell just west of Waldheim which already had a lime kiln built into the river bank (Rosthern Historical Society 1977:325). Blume hired Doukhobors from Petrofka to prepare for the burn and run the kiln. This involved breaking up the limestone found along the river with crowbars, hauling it to the kiln in wagons, chopping and drying trees, and firing the kiln continuously for three days and three nights (Klaassen:4). Based on the description of the kiln operation, this particular lime kiln was a flare kiln. It was fired for three days from the bottom in a firebox, with only limestone loaded into the top. The keystone in the arch of larger limestone had to be broken with a crowbar from the inside after the kiln was allowed to cool in order to let the lime fall and be unloaded (Klaassen:4).

Blume and his wife, Henrietta, loaded the lime into a wagon and hauled it to Rosthern where it was sold and used for foundations and plaster in some of the first buildings in Rosthern such as the hotel and the public school (Klaassen:4). Farmers in the area also travelled to the kiln site to purchase lime by the bushel for their own building projects requiring lime, such as brick and stone foundations, plaster and

cement. The lime was measured in a special bushel box and sold at 27.2 kg to the bushel (Klaassen:5). This lime appears to have been sold unslaked. Otto Blume's father-in-law Johann Warnke (Rosthern Historical Society 1977:325) slaked the lime for the foundation of their family home and later for the interior plaster (Klaassen:5). Otto Blume ran this kiln for three years, after which time limestone was found too far afield to make the venture profitable (Rosthern Historical Society 1977:325).

3.3.24 Seager Wheeler Homestead

Seager Wheeler purchased his first homestead in 1890 from the Temperance Colonization Society just north of Saskatoon and Wanuskewin Heritage Park on the west bank of the South Saskatchewan River (McKeand and Russell 1988:3). Before moving on to a new homestead near Rosthern in 1897, Wheeler made several improvements on the land including a trail to the river, a dugout house, sod stable, root cellar and lime kiln (McKeand and Russell 1988:4). He described how he built his lime kiln in his memoirs:

I chose a place to make a lime kiln on the top of the river bank, digging a deep hole wide enough for this purpose, just inside the edge of the bank. When it was deep enough I went down the bank at the bottom of the hole and cut out a space at the bottom for a fireplace to start a fire. I laid in small firewood then some dry lengths that would fit in flat and then put a layer of limestones, then a layer of firewood and so up to the top of the bank. I put a few thin sods on the top and started the fire at the bottom until the lime was read for use [McKeand and Russell 1988:6]

Wheeler is describing a running kiln - the layering of fuel and limestone in the shaft. Although he sealed it with sod and was not continually reloading with fuel and limestone from the top, it would be somewhat of a hybrid between a flare kiln and a running kiln. The remains of this lime kiln are no longer visible and were likely destroyed by slumping along the river, possibly the Warman Landslide in the 1960s (McKeand and Russell 1988:4). This kiln was likely built in order to provide lime for mortar, plaster and whitewash for the improvements Seager Wheeler had planned before making the move to the Rosthern area (Figure 3.46).



Figure 3.46: Seager Wheeler next to remains of a structure he built with lime products, late 1940s (Used with permission of the Saskatchewan Archives - R-A5789-1)

3.3.25 Wingard Ferry

When Ray Peterson arrived with his father Andrew Nelson from Denmark in 1882, they needed plaster to apply to the interior and exterior to provide insulation for the log home they had built on their homestead. They built a stone-lined kiln into a ravine next to a limestone outcrop on the North Saskatchewan River. This kiln measures 2.1 m in diameter with 2.4 m deep shaft and was a large pot kiln and is still mostly intact on the Peterson property near the Wingard Ferry crossing (Harold Peterson, personal communication 2011).

3.3.26 Young

When the railway made its way through Young, Saskatchewan in the early 1910s, an observant engineer by the name of J. J. McLean noticed a large exposure of limestone to the north of the town. He took a leave of absence from his railway job to pursue the production of lime in Young (Young Journal 1912). After testing the quality of the limestone and estimating the size of the outcrop, McLean built a small pot kiln in 1911 and processed his first batch of lime.

Positive reactions from contractors in Saskatoon, Regina, and other nearby towns where he had distributed the product from his first burn, encouraged McLean to begin construction of a larger kiln (Young Journal 1912). During the winter of 1911 McLean undertook an extensive research trip and visited many larger, lime burning operations which were not identified in the article. These trips likely extended to Ontario due to the similarities in design to kilns seen in Ontario beginning in the 1880s. Upon his return in the spring of 1912, he ordered building supplies of brick, cement and steel and hired men to build the new kiln (Figure 3.47).



Figure 3.47: “Lime kiln, Young, Sask.”, late 1910s (Used with permission of the Western Development Museum, George Shepherd Library)

This new kiln sat on a cement base that was 1.2 m high and 7.3 m square. On top of the base a cement form was built with the fireboxes within, measuring 4.5 m high and 5.7 m square. Drawing and stoking holes were lined with brick. A 1.27 cm thick metal cylinder 3.6 m in diameter and 10.3 m high was placed on top of the cement base and a 60.9 m long wooden trestle was added in order to hoist the limestone 16.1 m (Figure 3.48) to the top of the metal cylinder via a cable run by a hoist engine (Young Journal 1912).

As of 1912, this kiln had an output of 750 bushels of lime per day. The kiln was built just north of the town of Young near the outcrop of limestone. The limestone was crushed at the kiln site prior to being fed into the kiln (Young Celebration Committee 1981:523). The wood required for fuel was hauled from Poplar Park, located 25 km north of Watrous (Young Celebration Committee 1981:349).



Figure 3.48: Four people standing on the cement firebox by metal shaft of Young kiln, late 1910s (Courtesy of the Watrous Heritage Centre)

This is the only kiln recorded in Saskatchewan during the course of the present research that reached this scale of construction, required a large monetary investment in building materials, was built in an Ontario-industrial style, and was able to produce large amounts of lime from one burn. It also dates substantially later than the majority of other lime operations. The concrete base is still present north of town (Figure 3.49).



Figure 3.49: Concrete base remains of lime kiln in Young, 2012. (Courtesy of Debbie Read)

Division 6 - North West- Sites Visited During Field Survey

3.3.27 Fielding

The lime kiln south of Fielding was dug into the rolling terrain of a creek near the North Saskatchewan River (Figure 3.50), adjacent a historic school yard and the remains of a homestead. Although the lime kiln is still present at the site, the shaft and trench have collapsed, creating a slumped area with ash, crushed limestone (Figure 3.51) and melted earth (Figures 3.52) visible at the top and the bottom of the hill where the shaft and trench would have been (refer back to Figure 3.3 for cross-section diagram of kiln).



Figure 3.50: Creek valley as seen from kiln near North Saskatchewan River, August 20, 2011



Figure 3.51: Top of kiln shaft with broken pieces of limestone and ash, August 20, 2011



Figure 3.52: Broken limestone and melted earth at bottom of kiln shaft, August 20, 2011

The story of this kiln is outlined in a somewhat fanciful article from the October 17th, 1957 *Western Producer* written by Harold Baker. This kiln was built in 1905 by an American Englishman from Nebraska, Al Beckwith who dug the kiln by hand himself and borrowed a team of horses and a wagon from a neighbor to haul nearby fire killed poplar to the site to use as fuel. He collected limestone from the fields surrounding area with a wooden wheel barrow. The kiln was constructed with a stone archway separating the fuel from the limestone, making it a flare kiln. Although Beckwith built the kiln entirely on his own, when it came time to fire it, he recruited some neighbors and his stepson to help stoke and supervise the burn for five to six days.

The lime was in demand by people in the area who were still dependent on locally sourced building materials and this kiln produced about 130 bushels per burn. The lime was then sold for 40¢ to \$1.25 per bushel, advertising by word of mouth thanks to the close proximity of two heavily used trails. One of the trails was frequented by people to access the wooded areas where they procured house building materials, and the other by farmers every fall to bring their grain to market to Fielding.

According to Baker, the kiln was a great success owing to several reasons. First,

the hill on which it was built - steep and high - was perfect for building a kiln that was easily loaded from the top and unloaded from the bottom. Secondly, it was located where the fields yielded a large supply of limestone erratics. Third, good quality sand was also found nearby if those buying lime required sand for mortar. Fourth, there was the access to fire-killed poplar which didn't need to be dried or chopped, and fifth was the proximity of the kiln to heavily used trails. It appears that Al Beckwith sold his lime unslaked; when a Mennonite customer arrived with his wagon for thirty bushels of lime to plaster the interior and exterior of his house, he was warned of the impending rain and what that might do to his load of unslaked lime.

The same year this kiln was built, 1905, the railway also arrived at Fielding, which led to a switch in materials used for building as people were able to purchase alternative building materials for frame houses from merchants. There is still evidence that lime was used for plaster and whitewashing in the immediate area. The log house on the Arthur Davis homestead (Figure 3.53) two quarter sections away still shows evidence of lime whitewash on the exterior (Figure 3.54) and interior (Figure 3.55) walls, even after years of being used as a granary.



Figure 3.53: Log house on Arthur Davis homestead, near lime kiln, August 20, 2011



Figure 3.54: Detail of lath and chinking with lime whitewash visible over door, August 20, 2011



Figure 3.55: Lime plaster still present on interior walls, August 20, 2011

Division 6 - North West – Sites Not Physically Visited

3.3.28 Borden

The Clarke family arrived in the Borden area from Ontario in 1904. Having owned a sawmill in Ontario, they came with all of the door and window frames pre-cut and ready to install in their new home (Borden History Book Committee 1980:74). Unfortunately, they arrived late in the year and the stone house the family had begun planning was not built until 1905. Adam Clarke was a stonemason and built Kenjockity farm (Figure 3.56) overlooking the North Saskatchewan River (Figure 3.57). “Two lots of stones were burned to get enough lime” (Borden History Book Committee 1980:75) in a kiln built into the bank of the North Saskatchewan River.



Figure 3.56: “Kenjockity” fieldstone house built in 1905 by Adam Clarke, 2012 (Courtesy of Andrea Berry)



Figure 3.57: Ravine and North Saskatchewan River valley from Kenjockity, 2012 (Courtesy of Andrea Berry)

Other fieldstone features were also built on the property including a dog house, a well and raised garden beds. It is unclear if all of these fieldstone features were built contemporaneously with the initial construction of the house. The lime kiln could not be relocated.

3.3.29 *Waseca*

The lime in this area was produced by Dick Forest and his brother who arrived with the Barr Colonists from England in 1903. They settled near Waseca and built a pot kiln into a gully, quarrying limestone from a nearby surface exposure (Ray Forest, personal communication 2011). According to Mr. Forest, the lime from this kiln was used mostly for whitewash, which is likely the case.

There was also a sought-after craftsman, Frederick Long who arrived in the area in 1906 and who would have required lime. Frederick, who advertised himself as a “Mason, Bricklayer and Plasterer” in the local papers such as the *Waseca Herald* (Waseca History Book Committee 1984:21-22), was hired by the Canadian Bank of Commerce in September of 1907 to work on the foundation and plastering of their new

building in Lloyminster. Although the bank offered him work on their other branch buildings, Frederick declined and returned to England after the death of his wife in 1911 (Waseca History Book Committee 1984:371-372).

Northern Saskatchewan – Sites Not Physically Visited

3.3.30 La Ronge

In a letter dated February 9, 1947 from Mr. F. Hives to Mr. Hoey, the burning down of St. George's Indian Residential School at La Ronge (Hives 1947:1) and the necessity to construct a new building for the children in the community was discussed. The construction of a new school required lime and ash for the concrete foundation, so a lime kiln was built on the shore of Lac La Ronge (Tom Charles, personal communication 2013). This kiln was built by quarrying into the limestone outcrop in a funnel shape and burning the resulting quarried limestone in the hole that resulted from the quarrying (Figure 3.58, 3.59).



Figure 3.58: Lime kiln as a result of a quarry hole, 2013 (Courtesy of Tom Charles)



Figure 3.59: Lime kiln as a result of a quarry hole, 2013 (Courtesy of Tom Charles)

The resulting lime was then hauled by canoe from the shore of the lake to the site of the new school next to the church, until someone offered to freight cement in from the south (Tom Charles, personal communication 2013). This kiln appears to have a very large diameter at the top of the shaft and is still intact on the lake shore.

There is also a brief mention of a lime kiln (Figure 3.60) being burnt in 1854 to aid in the construction of Stanley Mission but no further details were provided.

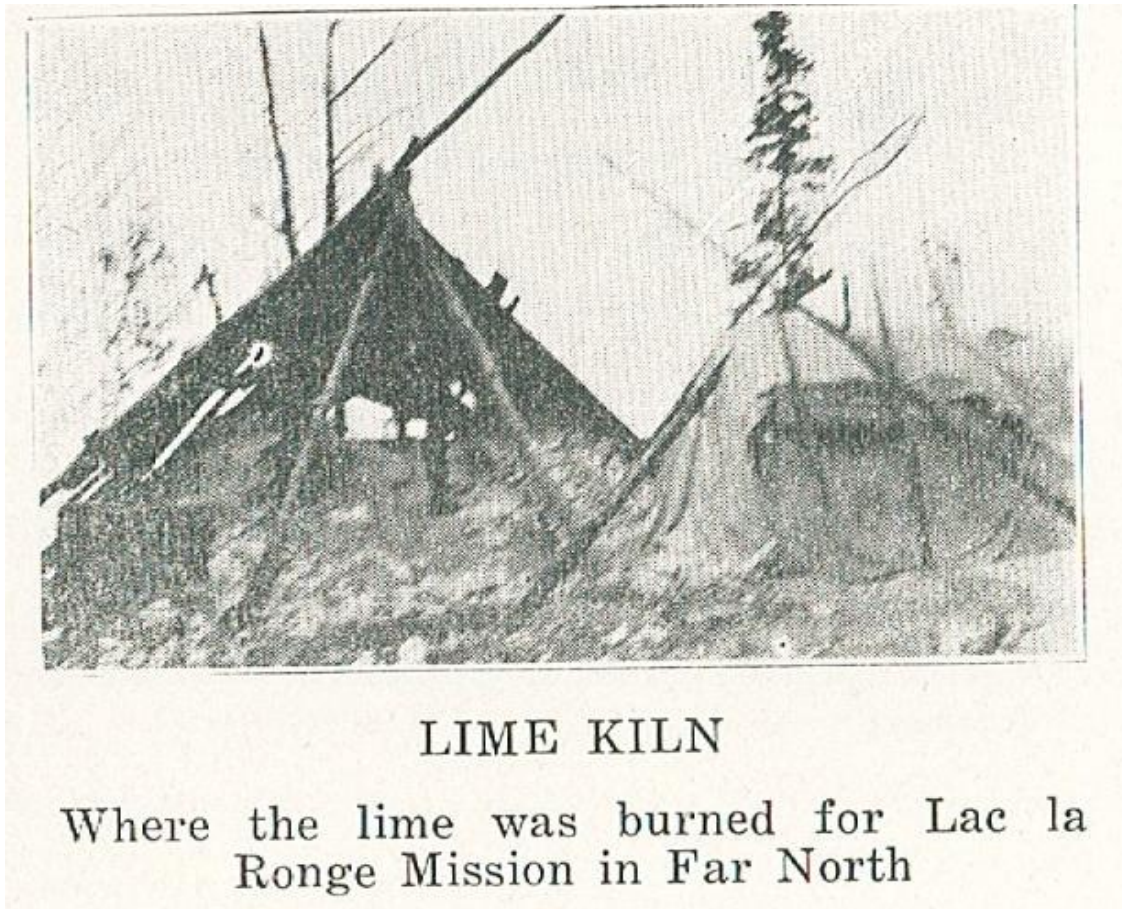


Figure 3.60: “Where the lime was burned for Lac la Ronge Mission in Far North”, possibly showing a kiln with cover (From *Saskatchewan and Its People* by John Hawkes, 1924:353)

3.3.31 Peter Pond Lake

The remains of three lime kilns are located 60 m from the cellar depression of a small cabin on the south shore of Peter Pond Lake near Willow Point or *Watsaze*. The Saskatchewan Archaeological Resource Record for this site (GLOf-06) identifies these kilns as associated with “Historic Dene” culture. These three lime kilns may have been connected with fur trade activity with the lime being used for the construction of the small cabin nearby, or shipped to fur trade posts for construction use there, or as seen in New Finland used in the tanning process. The kilns (Figure 3.61, 3.62) were mapped in 2005 by Buffalo River Dene youth and elders during a Historical Places Pilot Project. No other information was available regarding the origin or use of these kilns.



Figure 3.61: Remains of a lime kiln on the shore of Peter Pond Lake, 2005 (Courtesy of Western Heritage Services Inc.)



Figure 3.62: Burnt interior wall of a lime kiln on the shore of Peter Pond Lake, 2005 (Courtesy of Western Heritage Services Inc.)

3.4 Summary of Site Characteristics

Nearly all of the lime kiln sites described above had several consistent variables. Rolling topography or steep valley sides were a constant characteristic. Such terrain provided adequate elevation to build a lime kiln into a landform without the need to construct the infrastructure with purchased materials. This also reduced time and labour spent in construction and aided in the ease of loading the kiln with limestone from the top of the slope, and fuel at its base of the hill, as well as the emptying of the lime from the bottom of the kiln.

Many of the kilns were located in close proximity to the raw materials needed to burn lime. Small outcrops of limestone could be quarried by hand, or plentiful limestone scattered on the prairie by glacial activity could be gathered and loaded into wagons. Once at the kiln site, the pieces of limestone were broken into smaller fragments using chisels, hammers, crow-bars or other tools to ensure all limestone was burnt evenly. The most obvious indicator of a lime kiln, even when the actual structure no longer exists is the remnant broken limestone at the top of the kiln where it would have been fed into the top of the shaft (Figure 3.63).



Figure 3.63: Crushed limestone next to kiln shaft north of Arcola, August 30, 2012.

Available fuel in the form of wood was never more than 60 km away because of the time-consuming nature of felling the trees, chopping the wood and moving the fuel to the kiln site. Most kilns were near well-used trails for ease of transporting raw materials and to be able to advertise the availability of lime through word of mouth to those travelling along these networks.

Having access to a small labour pool to aid in the burning of the kiln was vital for several kiln operators, although most procured the raw materials and ran the kilns themselves with the help of family members. Evidence of their labour is seen in some of the earliest European architectural structures in the vicinity of most communities associated with kilns, which utilized lime products in their construction.

Most of the lime kilns documented here had similar dimensions: 1.8 to 2.4 m in diameter with an approximate 4.5 m shaft depth. Kilns were either left with earthen walls or lined with stone. These kilns were consistently identified as flare kilns, with the shaft being filled with limestone only and burned for a finite period of time. One kiln was burned as a flare/running kiln hybrid, with the shaft filled with alternating layers of fuel and limestone. It sealed at the top and was not continuously reloaded as the burn proceeded.

In almost every example, these kilns were burned consistently for several years and ceased abruptly when each community was reached by the railway. The railway brought lime produced elsewhere in Canada on an industrial scale as well as building materials that were not available to the earliest settlers. These materials reflected a change in the architectural preferences of new settlers as they moved away from traditional building techniques and began favoring frame houses built with milled lumber. In most cases lime was no longer used in these new homes.

CHAPTER 4

DISCUSSION AND CONTEXT OF LIME PRODUCTION IN SASKATCHEWAN

4.1 Discussion

Each individual site description reads like a narrative. Every kiln tells a unique story of livelihood, small industry and early settlement. Many early homesteaders in Saskatchewan had to supplement their agricultural activity by burning lime on a small, local scale. Most goods and services were unavailable to early settlers who arrived on their homesteads. They had to make do with the raw materials available on their land and their previously acquired knowledge to produce the products they required.

If you arrived in Saskatchewan as a homesteader with minimal funds, as most did, the options that were available when it came to making money were limited. Distance, isolation, lack of existing job markets and the often unattainable demands of proving up a homestead could all hinder the creation of a much needed income. This is where burning lime enters the picture. If you had a basic understanding of how the process worked, had time to dig a kiln, cut wood and gather limestone, you could generate a small income. Many homesteaders arrived after any agricultural activity would be possible for the year, but clearing land of trees and stones could be done, and the products of these efforts could be used to burn lime.

This process was labour intensive. Some took it on individually, as was the case with Al Beckwith near Fielding. He built the kiln entirely on his own. He gathered the limestone, cut the wood and hauled everything to his kiln site. It was only when it came to the long, intensive burn that required constant supervision that he asked his neighbors for help. The Fisher brothers near Birch Hills built and ran their kiln as a team after learning the process from a Métis man in the area. The Murray brothers near Lipton found a limestone outcrop and saw the opportunity in turning stone into money. Both the Murray brothers and the Blume family near Rosthern built special wagons to aid the delivery of the freshly burnt lime to other new homesteaders in the area as well

as larger municipally or privately funded building projects farther afield. The settlers in New Finland counted on the help of their children to gather the limestone from the fields and load it into wagons. The Blume family hired the Doukhobors who settled near Rosthern to prepare the raw materials needed to burn the kiln that was on the property when they purchased their homestead. Lime kilns were a source of income not only for those who ran them for their own financial purposes but for others in the area seeking employment, when no other jobs near their own homesteads were available.

When J.J. Smith got into the lime business in Yorkton, he hired many men to gather limestone from the fields and cut and haul wood 56 km to the kiln site. He also dabbled in brick making which goes hand in hand with lime production as you cannot build brick structures without lime mortar. Near Star City, William James Anderson had been burning lime for a few years for his own building projects when the railway arrived in 1903. In most other areas of Saskatchewan, the arrival of the railway spelled the end for lime production when a variety of building materials became available, but in this case a brick yard was established nearby, so the limestone he was producing was a conveniently-placed commodity.

Lime was indeed a necessary commodity in the early settlement days in Saskatchewan. There was a need and a market; therefore people were willing to dedicate time, labour and money and hired local labour to assist in the process. Some even invested greatly in infrastructure as was the case in Young. J.J. McLean began by building a small pot kiln in order to test the quality of the lime he was able to produce from a large outcrop nearby. The quality was so good and the demand so great, that, after an extensive research trip, he built a kiln on a scale not seen in Saskatchewan at all, but similar to those seen in Ontario in the 1880s along major railway lines. The monetary investment required to build such a kiln would have been enormous, but the gamble paid off. By 1912 McLean was producing 750 bushels of lime per burn from his kiln, supplying building projects in the larger, growing cities in Saskatchewan. The word had spread and his lime was sought after.

The kiln at Young was an exception and most people ran only small scale kiln

operations, dug directly into the side of hills or ravines or river valleys which omitted the need to buy any building supplies for the infrastructure. Building into the hillside also allowed for the kiln shaft to be filled with limestone with ease. These smaller scale producers usually started out supplying lime for their own building projects. When they had fulfilled their own needs, some homesteaders continued to burn limestone in order to supply enough product to newly arrived neighbors who had to meet the same homesteading requirements and who also needed homes well-insulated against the cold of the winter and the heat of prairie summers. Once the news had spread that they had a producing kiln, new homesteaders sometimes arrived to pick up loads of lime. Most producers ended up with a surplus of lime which was volatile when unslaked and could not be stored for long periods slaked, so most were more than willing to sell their surplus to neighbors. When Al Beckwith helped a customer load his wagon with freshly burnt lime, he warned him about the dangers of travelling with a wagon-full of unslaked lime as they noted storm clouds approaching (Baker 1957). Due to the danger of transporting unslaked lime, small-scale producers sold their lime locally and did not attempt to tap into markets further afield.

Many kilns were burnt for more than one season if they were structurally sound and did not collapse as did the Fisher brothers' first kiln and the first kiln built by Thomas Hislop. Some lime burners also built more than one kiln nearby in order to produce more lime at one location as was the case near Arcola and in Peturrson's Ravine north of Saskatoon. Log structures required re-plastering and re-whitewashing every season; therefore, a fresh supply of lime had to be made available. Some re-plastered in the fall to prepare for winter, while others, such as Ukrainian families, applied new plaster and a fresh coat of whitewash every spring as a seasonal rite of renewal. Sidney Pawlowsky recalls the whitewashing of his fathers house built in 1911:

Just before Easter he would always give the interior a new coat of sparkling whitewash. This was an annual practice, a sign of the 'revival of life' when the old smells and smoke seared walls were once again exuding the fresh, clean smell of lime [Fodchuk 2006:44].

Other ethnic groups that also built with logs, such as the Finnish, Swedish,

Czechoslovakians and Danish, all plastered seasonally to maintain their homes. Lime also acted as a disinfectant, killing insects as well as their larvae, specifically ticks and bedbugs housed in between the logs (Houser 1976:50-51; Luhtala:40). The sparkling white of a new coat of lime also gave the often poorly lit and difficult to clean houses a bright and tidy look.

Some kilns were built to supply lime for one project only. The lime kiln at Goodwin House was built and run by Mr. LaRocque specifically to supply lime to make mortar when the fieldstone house was constructed by stonemasons in 1898. There were no other known homes or structures in the area that made use of the lime from this kiln.

Lime kilns built on First Nations reserves are also representative of some of the earliest built during the settlement in Saskatchewan. According to the Department of Indian Affairs Annual Reports (1864-1990), the construction and running of kilns were often encouraged by the Indian Agents as a means of income for the first residents of these reserves. Many of these kilns provided lime to new European settlers and in some cases these kilns were the first producing kilns in the area. When the congregation at Wishart decided to build their new church out of fieldstone in 1888, the lime was provided by the kiln operating on George Gordon's Reserve. The presence of lime kilns on reserves can also be explained by the role lime played in sanitation. The new homes that were being built on reserves to house a formerly nomadic community were often deemed by the Indian Agent to be unsanitary, so lime was often prescribed as the proper way to sanitize a home and keeping it looking clean according to European standards.

Most of the small-scale kilns utilized nearby wood sources and were conveniently placed in river valleys or water courses which were well treed. The larger scale kilns, such as those in Yorkton, Young and the four that were built north of Arcola all required that wood be cut and hauled from distant locations, sometimes up to 56 km away. It seemed that on this scale, it was easier to build the kiln near either the market, the sources of limestone or the specific building project and less work to haul wood to the burn site. In large part this may have been due to the volatility of the resulting quicklime.

It would have taken vast amounts of wood to burn a kiln of any size. Lime kilns in Ontario similar in size to the one operating in Young required up to 22 cords of wood per day. One cord of wood is 3.62 cubic m in volume; therefore, a maximum of 79.64 cubic m of cordwood could have been needed to burn this kiln. As in Ontario, the industry of supplying wood for use in kilns also occurred in Alberta. Residents of the Stony Reserve found indirect employment in the lime industry by cutting and hauling wood to the large-scale lime kilns running in Kananaskis and Exshaw (Department of Indian Affairs 1907:175). Lime production was an industry in itself and created smaller supporting industries.

There is a strong correlation between lime kiln location and transportation routes. During the fur trade, rivers were primary transportation corridors. York Boats and then canoes serviced the fur trade posts located along main watercourses, all leading back to York Factory at Hudson Bay. With changes in the economics of the fur trade, Métis Red River Carts began to dominate the prairies as the main mode of transportation and for the movement of goods, resulting in a network of trails across the west.

Howard Shillington listed several communities with known limeburners and operating kilns associated with early trails (Historic Land Trails of Saskatchewan 1985). This included Birtle (Manitoba), Cumberland House the “crossroads from Prairies to York Factory” (Shillington 1985:45), from Fort a la Corne past Birch Hills to “Big Hill”; which was noted to be covered in limestone. Early trails also ran through Moosomin, Qu’Appelle, Regina, Moose Jaw, Swift Current, Saskatchewan Landing, Red Pheasant Indian Reserve, Qu’Appelle to Prince Albert through St. Louis and Prince Albert to Fort Carlton which is near the Nisbet Forest and Wingard Ferry. When Shillington’s map (1985:119) is laid over a map of Saskatchewan with all known lime kiln sites plotted (Figure 4.1 and Table 1.1), it is clear that the vast majority of these sites are located along trails that were well established by the early 1880s.

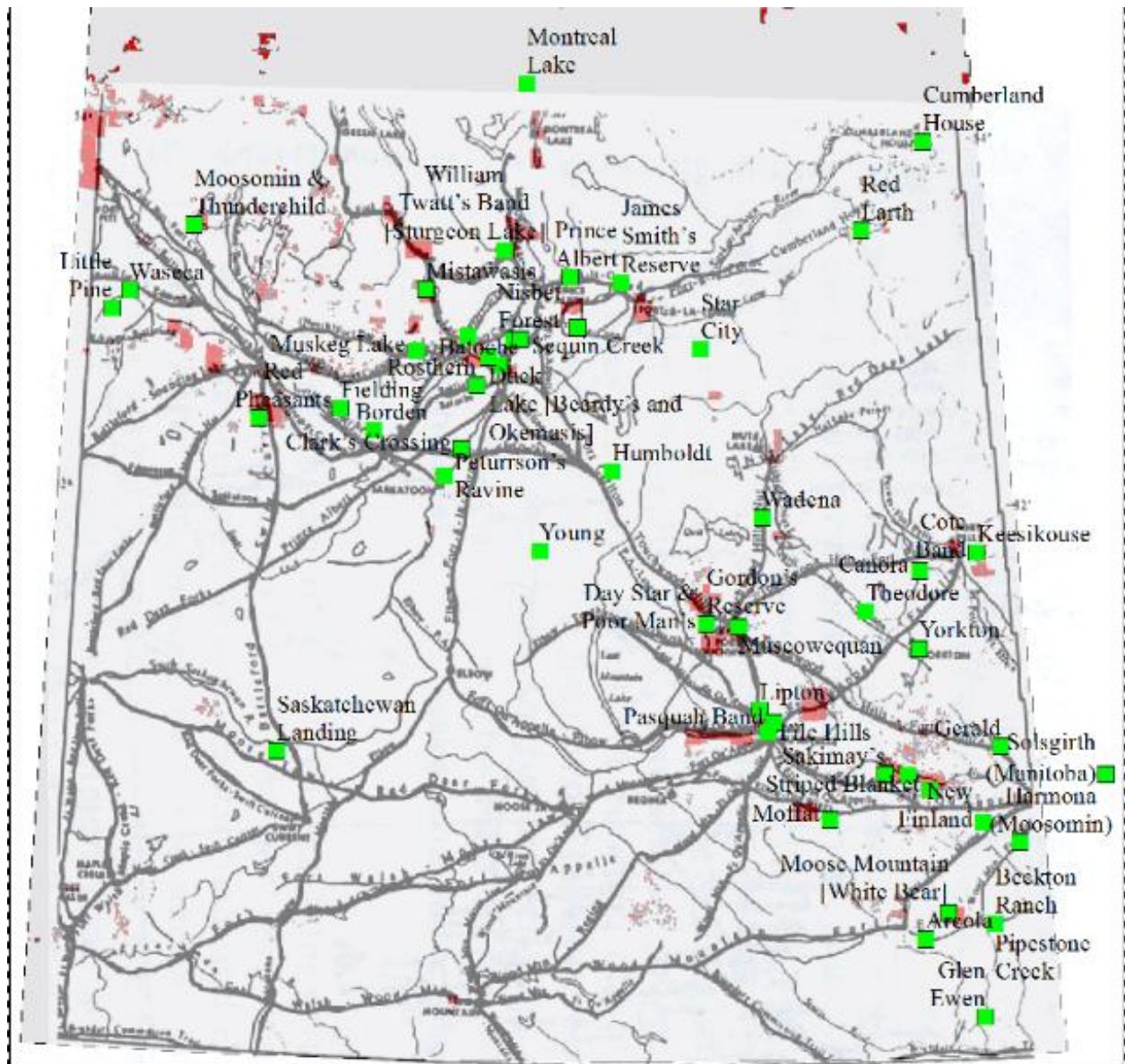


Figure 4.1: Sites of lime kilns (green squares) found during research associated with European communities and First Nations reserves (in red) - plotted in relation to early historic land trails, 2014 (Created by Robert Alary, Data & GIS Services, University of Saskatchewan with authors data and trails map from *Historic Land Trails of Saskatchewan* by Howard Shillington, 1985:119 “Old Land Trails of Saskatchewan about the early 1880’s”) - two northern kilns are not shown on this map - Peter Pond Lake and Lac La Ronge.

Table 1 - Known Lime Kilns in Saskatchewan

Thesis Section and Community	Date	Affiliation	Operator Name
[x]=not discussed [FNR]=First Nations Reserve			
3.3.1 Arcola	1883	?	W.T. Hislop
3.3.16 Batoche	1880	Métis	?
3.3.2 Beckton Ranch	1887	English	?
3.3.17 Birch Hills	Late 1910s	Métis/English	Ernest Fisher Sr.
3.3.28 Borden	1905	Ontarian	Adam Clarke
[x] Canora	?	?	?
3.3.20 Clark's Crossing	1880s	Ontarian	J.P. Lake?
[FNR] Cote Band	1895	Salteaux	Chief Cote
2.2 Cumberland House	?	English? Scottish?	?
[FNR] Day Star & Poor Man's	1891, 1892, 1902	Chippewa	?
[FNR] Duck Lake [Beardy's & Okemasis]	1891	Cree	?
3.3.27 Fielding	1905	American/English	Harold Baker
[FNR] File Hills	1895	Nakota, Cree, Assinboine	?
3.3.3. Gerald	1903	English	Burnell brothers
3.3.6 Glen Ewen	?	Irish	Wallace family
4.1 Gordon's Reserve	1889, 1895, 1901	Saulteaux, Cree	Josiah Pratt
3.3.7 Harmona (Moosomin)	1890s	Manitoban	?
[x] Humboldt	?	?	?

[FNR] James Smith's Reserve	1895, 1896	Cree	?
[FNR] Kahkewistahaw's	1899	Salteaux, Cree	?

[FNR] Keesikouse	1893	Ojibway	?
3.3.30 La Ronge	1854, 1947	?	?
2.2 Lethbridge (Alberta)	1880s	Scottish	George Frank Russell
3.3.8 Lipton	1884	Ontarian	George & Tom Murray
[FNR] Little Pine	1895	Plains Cree	?
[FNR] Mistawasis	1893	Cree	
3.3.9 Moffat	1884	Scottish	William Gibson
[FNR] Montreal Lake	1907	Woodland Cree	?
[FNR] Moose Mountain [White Bear]	1888, 1892, 1902, 1903	Saulteaux, Cree, Nakota, Dakota	?
[FNR] Moosomin & Thunderchild	1884	Salteaux	?
[FNR] Muscowequan	1895	Salteaux	Mahigans & Francis Joseph
[FNR] Muskeg Lake	1893	Cree	?
3.3.10 New Finland (Wapella)	?	Finnish	Tahvo Kalmi, Mikko Myllymaki, John Saari, Salomon Petays, Kalle Katajamaki, John Kangas, and Toivo Koskela
3.3.18 Nisbet Forest	1930s	?	Seeley Brothers
[FNR] Pasquah	1892, 1893	Cree	Josiah Matoney,

Band			Antoine Cyr
3.3.31 Peter Pond Lake	?	Historic Dene?	?
3.3.21 Peturrson's Ravine	1880s	?	?
3.3.4 Pipestone Creek (Kelso)	1880s-1890s	English	?
3.3.22 Prince Albert	1890s	Irish	Charlie & Andrew Byrne
[x] Qu'Appelle (Fort)	?	?	?

[FNR] Red Earth	1909	Plains Cree	?
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[FNR] Red Pheasants	1893	Cree	?
3.3.23. Rosthern	1904	American	Otto and Henrietta Blume
[FNR] Sakimay's	1889	Cree	Kesick & Cumiscoat
3.3.11 Saskatchewan Landing	1897	Métis	Mr. LaRocque
3.3.24 Seager Wheeler (Saskatoon)	1890	English	Seager Wheeler
3.3.19 Sequin Creek	?	?	?
2.2 Solsgirth (Manitoba)	1890s, 1900s	Irish	?
3.3.12 Star City	1900	?	William Anderson
[FNR] Striped Blanket	1896	?	?
3.3.13 Theodore	?	?	?

[FNR] Touchwood Hills [Day Star]	1891	Chippewa	J. Pratt
3.3.14 Wadena	1903	Swedish	Pete Ericson
3.3.29 Waseca	1903	English	Dick Forest
[FNR] William Twatt's [Sturgeon Lake]	1895	Cree	?
3.3.25. Wingard Ferry	1882	Danish	Ray Peterson & Andrew Nelson
3.3.15 Yorkton	1890s	?	J.J. Smith
3.3.26 Young	1911	Ontarian	J.J. McLean

Steamboats in the form of sternwheelers were next to appear, but the ever shifting and difficult-to-maneuver prairie watercourses ensured this attempt was short-lived. The railway quickly overtook the west. The trajectory of the first line was proposed in 1872 (Figure 4.2) and was preceded by a telegraph line and trail from Pelly, Humboldt, Prince Albert as well as Battleford to Clark's Crossing (Shillington 1985:116).

When the railway changed the location of the proposed line in 1882 from a northern route to a southern route through Moosomin, Qu'Appelle, Regina, Moose Jaw and Swift Current, Métis freighters had to change their east-west trail routes to north-south trail routes, moving between these railway towns (Shillington 1985:129).



Figure 4.2: Crop of “Map of Manitoba, Keewatin, British Columbia, & North West Territory shewing the country to be traversed by the [C.P.R.]”, 1880. (Courtesy of the University of Saskatchewan, Special Collections - full map can be seen here: <http://saskhistoryonline.ca/fedora/repository/spcoll%3A7242>).

All of the towns mentioned in the initial 1872 railway route and the towns in the 1882 revision are associated with lime kilns or were mentioned as being markets for

lime produced nearby. These towns and settlements sprang up as a result of existing transportation routes in the prairie west. Because lime kilns are a result of a new population meeting their needs for building materials using resources at hand, we see lime being produced where these new populations settled, which happened to occur along established trails and new railway routes running from the southeast to the northwest of Saskatchewan.

Lime produced in Saskatchewan was not being transported very far afield from the kiln in which it was produced, and in most cases it was only being moved to the nearest homesteads and towns for use. What made these trails relevant in relation to the location of lime kilns were the inhabitants of the prairies travelling along them. People used them to get to their homesteads. They interacted with other people along the way and shared knowledge and skill. A market for lime and other locally produced products was created for and by these homesteaders and these trails represented a network for information, news and goods. Lime was a highly sought-after commodity but the market did not seem to be a competitive one. With the exception of New Finland, there was usually only one individual or group working cooperatively to produce lime in a given area. Although small scale, these kilns supplied enough material for those few early settlers in each area. There were no examples found of two competing lime kilns in a community.

It was only when the railway arrived in each community that (in most cases) lime stopped being produced locally. When the railway did finally reach these communities, cheaper lime produced commercially elsewhere, likely Ontario and Quebec, became available. Alternative building materials could be ordered and shipped via rail and the use of locally produced building materials declined. Most people were shifting away from their original log and stone homes and ordering materials to build frame houses made popular in a variety of mail order catalogues once the railways began servicing the towns nearest to their homesteads, usually by the late 1900s. Some opted to order full houses out of catalogues which arrived on the train and once transported to the homestead, were constructed fully on site. All of these variables spelled the end for small scale lime production in Saskatchewan as an early settlement industry.

4.2 Population Density and Lime Production in Saskatchewan

The distribution of lime kilns in Saskatchewan is intriguing although not surprising. As discussed previously, lime kilns occur from the southeast corner to the northwest corner of Saskatchewan in a fairly large swath along the aspen parkland. This swath can be correlated to other variables that affected settlement on the prairies, although there is no single factor that contributes to this distribution.

First we must look at the population density in Saskatchewan during the homesteading days. The earliest available information was based on census information for township populations (Mackintosh 1934:62) and as of 1901 the majority of the population density in Saskatchewan was clustered near the border of Manitoba in the southern portion of Saskatchewan and expanded in a north westerly direction (Figure 4.3).

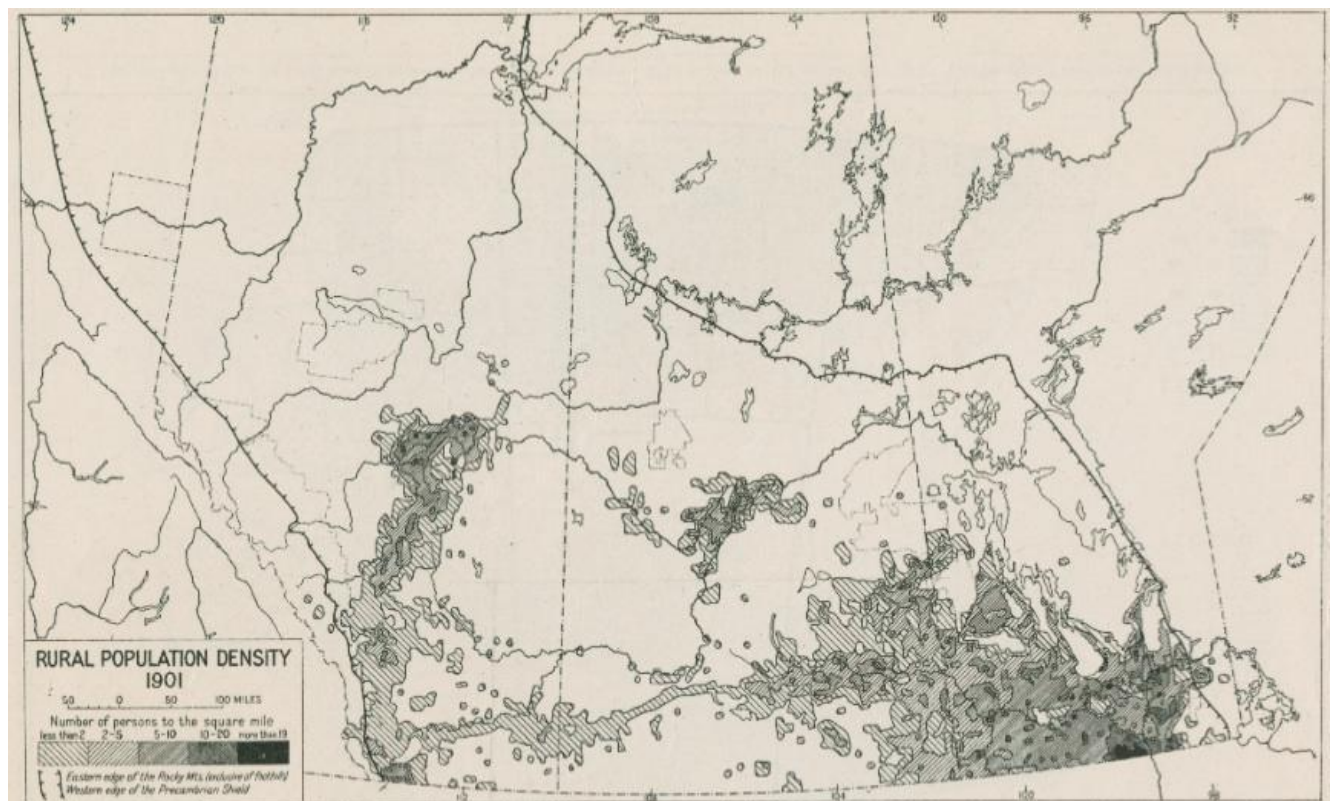


Figure 4.3: Rural population density 1901. (From *Volume 1 Prairie Settlement The Geographical Setting* by W.A. Mackintosh, 1934:62).

The population density in the early days of Saskatchewan correlates with railway accessibility (Figure 4.4). Obviously, people preferred to settle near towns that were projected to be associated with railway lines for a variety of reasons, but most importantly to be able to ship the grain they were producing to markets as quickly and effectively as possible. From 1886 to 1891, the railway lines grew substantially, reaching further north in Saskatchewan and further north, south and west in Alberta and with them grew the EuroCanadian population of western Canada.

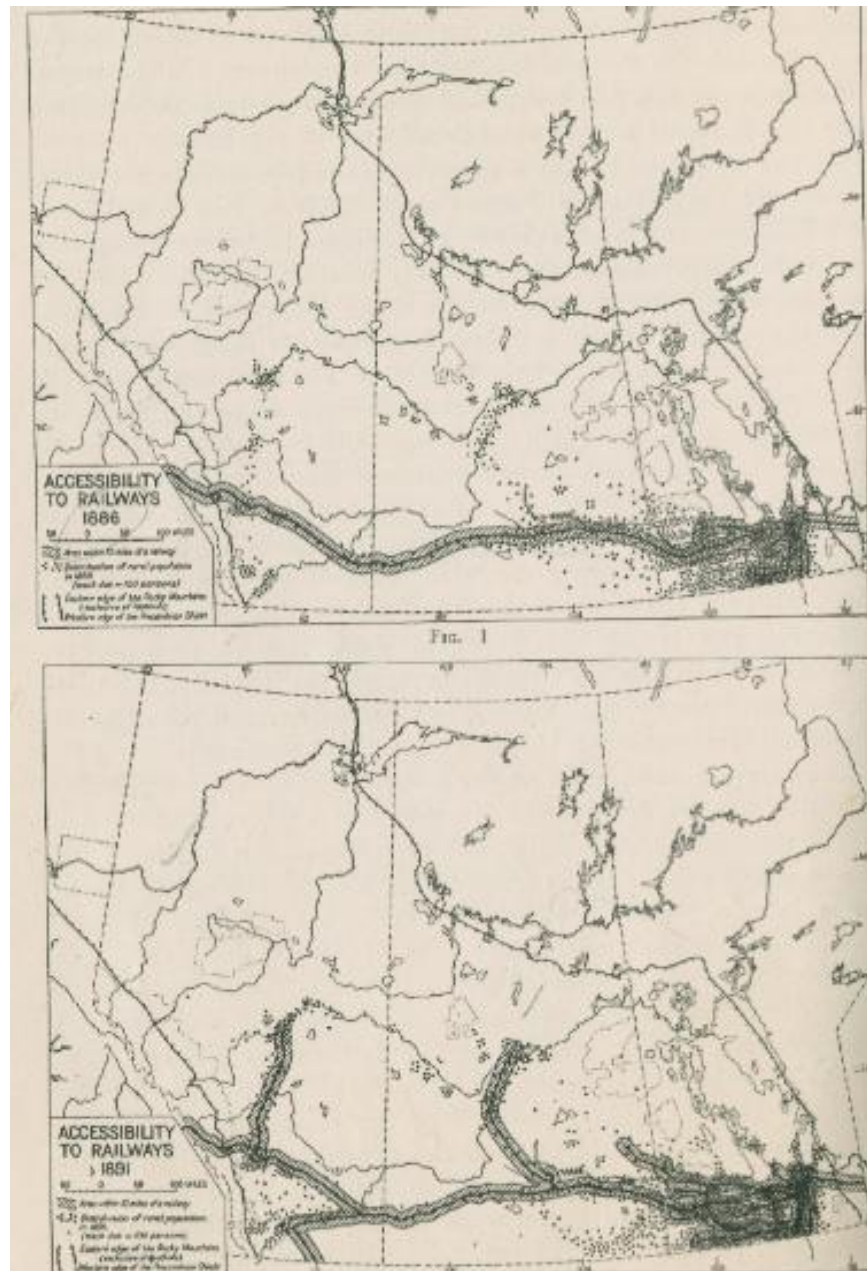


Figure 4.4: Accessibility to railways 1886 and 1891. (From *Volume 1 Prairie Settlement The Geographical Setting* by W.A. Mackintosh, 1934:48).

The rural population of Saskatchewan was also associated with the areas that are ideal for growing wheat (Figure 4.5). Geographically, the areas of Saskatchewan from the southeast corner to the northwest corner were best suited for agricultural activity. Most people lived where they worked, and most people were attempting agricultural activity on their homestead claims in the aspen parkland.

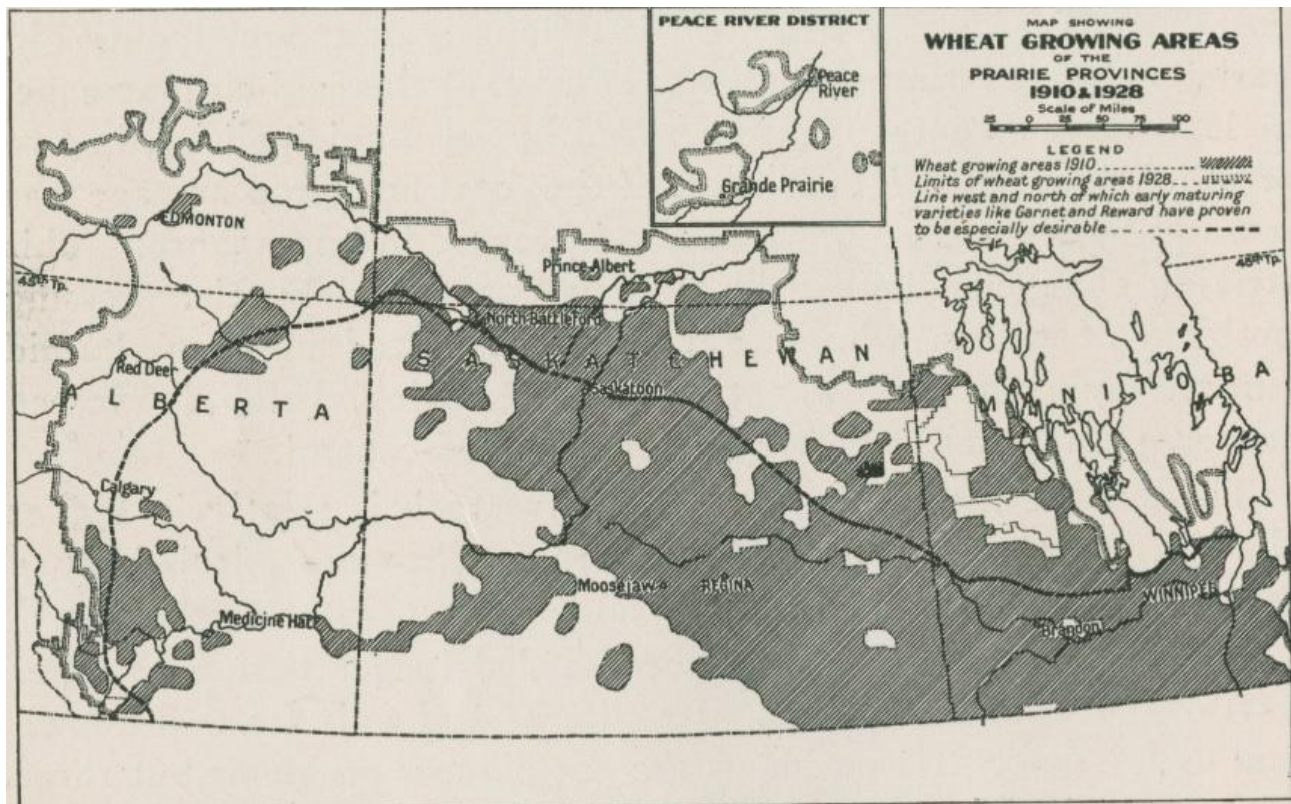


Figure 4.5: Wheat growing areas of the prairie provinces 1910 & 1928. (From *Volume 1 Prairie Settlement The Geographical Setting* by W.A. Mackintosh, 1934:90).

In comparison to the areas of eastern and central Saskatchewan, the southwest of the province was dominated by ranching (Figure 4.6). Since this portion of the province was unsuitable for agriculture, those who settled here chose to raise cattle in the open rangelands instead.

With the exception of the kiln at Goodwin House, no lime kilns in the southwest corner of Saskatchewan were identified through the course of this research. This area was dominated by ranching activity, and historically had a much lower population density compared to the southeast to northwest swath. It is possible that there are kilns

in these areas, but were fewer in number and not as well known due to a consistently sparser population throughout historic times and into the present.

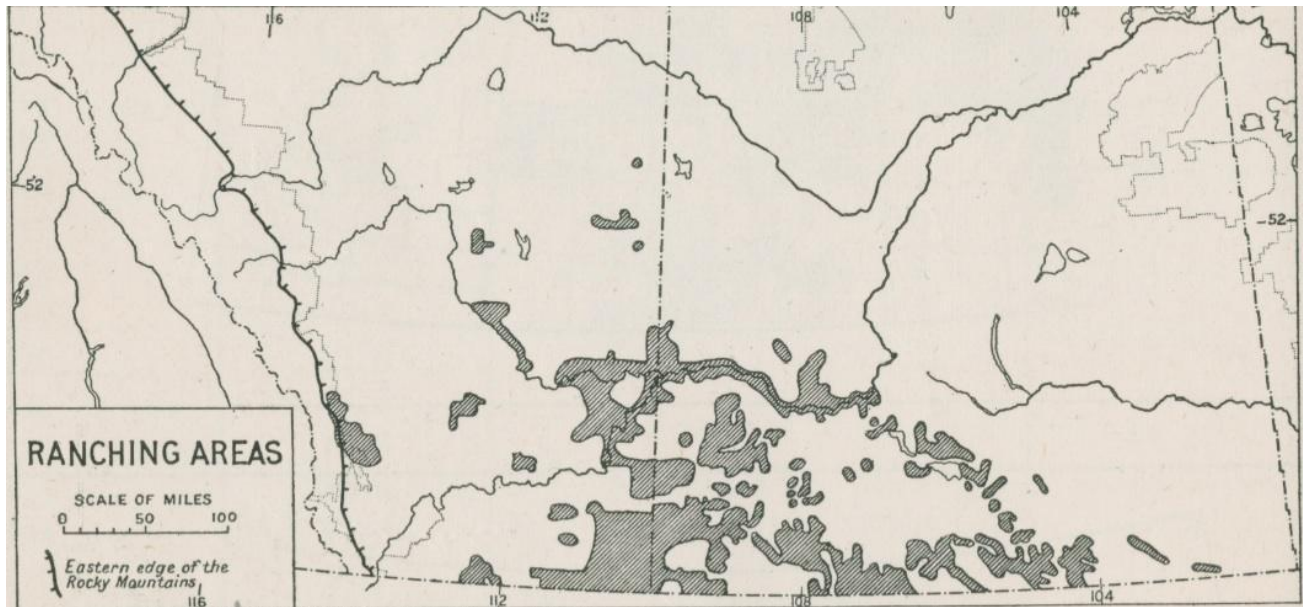


Figure 4.6: Ranching areas (Crown grazing leases only). (From *Volume 1 Prairie Settlement The Geographical Setting* by W.A. Mackintosh, 1934:130)

Lime production in Saskatchewan seemed to have occurred where there was the highest density of people. Many of these people were in those areas due to the accessibility to the railway system and their participation in raising grain crops.

The presence of lime kilns indicates that homesteaders were engaging in early small-scale industry in Saskatchewan. Lime burning was one of the few ways new settlers could use knowledge kept or knowledge gained on their journey to generate useful and sought after materials using the raw materials available on their new homestead. The production of lime in Saskatchewan played a very early and significant role in the early economic development of this province. Lime was a commodity and seemingly anyone building a house would require it in order to make these structures appropriate for harsh prairie weather. When EuroCanadian settlers began arriving in Saskatchewan, they travelled along the trails that had been established previously for a series of different economic models. These lime kilns predominantly occur in the earliest areas of homesteading activity which occur along early trail systems and are indicative of the most ideal areas for settlement.

Lime kilns represent another shift in the economic functioning of Saskatchewan, from that of an “open” and “unsettled” place to that of settled, permanent, agrarian communities. The kilns themselves however, only represent the earliest days of this shift. As towns became more firmly established with infrastructure and services, most specifically the railway systems, access to outside markets effectively ended small scale lime production in Saskatchewan. With well-established, high quantity producers in the east, the time and effort to run a small kiln in order to create a product that could be bought more cheaply was no longer worth it, especially when the role lime played in the architectural preferences of these new settlers was waning.

Chapter 5

Conclusions & Future Work

5.1 Conclusions

The lime kilns I have described in this thesis exemplify the physical remains of locally executed small industries performed by community residents, meant to supply a necessary material to their closest local market. These were not formalized industries as was the case in other areas of Canada. No regular accounts of raw materials gathered and processed had to be submitted; there are no payroll, sales or shipping records, no blueprints for the kiln's design. This lack of documentary evidence means that we must rely on the physical remains of these operations to gather information. The use of the perspectives and techniques associated with archaeological research can be used to successfully distinguish and analyze these types of sites. What remains of these kilns are the physical remnants of activities performed in the past. Archaeology is used to assist in reading these vestiges of industry in order to better understand the context of their composition and functionality.

These industrial features must also be associated with their surroundings by using landscape archaeology to study the ways in which people interacted with and upon the landscape. One approach in landscape archaeology involves reading the landscape as if it were a primary document, which “deserves the same critical, but respectful treatment as any other document” (Alfrey and Clarks 1993:199). A landscape bears the marks of natural processes as well as those caused by humans; a physical history that may be interpreted in any number of ways (Alfrey and Clarks 1993:31).

How people assessed their surroundings for the availability of necessary natural resources and appropriate topographical features to ensure a successful kiln must be taken into consideration when studying lime kilns. A vast amount of labour went into building the kilns and moving the large amounts of raw material to the sites, a situation that lends itself to a deeper appreciation of the landscape travelled by these first settlers and the great deal of trouble they went to in order to meet their needs.

Lime kilns built into riverbanks, coulees or hillsides tell us of a decision making process where an individual assessed a great many factors and variables. Ultimately, an area was chosen that would ensure a successfully run lime kiln by meeting the needs for materials and transportation and utilizing topography to make up for a lack of building materials to meet infrastructure requirements. The kiln remnants that we see today serve to fill in the rest of the now lost system that once surrounded it: the mining of the lime, the construction and operation of the kiln, the movement of the finished product to local homes, the trails that served to carry it and the people who travelled them.

The interpretation of these interactions can fill in some of the information missing in existing documentary evidence (Gordon and Malone 1994:5, Buhr 1997:79) and contribute data to those lacking any sort of documentary evidence at all.

In Canada, the remains of most industrial sites of any size represent the past interactions of newly arrived European settlers with unfamiliar environments. Due to the lack of established transportations networks, self-sufficiency among new homesteaders was of the utmost importance in order to produce essential materials (Palmer and Neaverson 1998:17). Existing technologies were imported, borrowed and adapted (Newell 1986:1,9) to meet the needs of new populations and many of these early industrial activities were executed as a supplement to the dominant agricultural economic models (Alfrey and Clarks 1993:127). This was especially the case if the area was not suitable for growing crops.

Many of the small industrial activities associated with early settlement in North America were highly dispersed and the location of raw materials used in them may not necessarily have been the same location where the finished item was produced (Palmer and Neaverson 1998:17). Lime, however, was considered to be of “such low value in proportion to [its] weight that the cost of transportation restricted [its] markets to local uses” (Newell 1986:11). Thus we see the lime kilns being constructed at the location where not only the lime could be most easily acquired but where the greatest immediate need for the lime produced was found.

The present poor state of preservation of most of the remaining lime kilns, paired with the lack of information regarding the lime industry in Saskatchewan means that the significance of these sites is often underplayed. It is also difficult to provide context for these sites; imagining them when they were operating features would be a difficult thing for most individuals (Gordon and Malone 1994:20). The sounds, heat, smell and the hard work required are also important elements in understanding the significance of these sites. It was not a small undertaking to decide to produce lime, but a large commitment of time, labour and materials, wrought with the dangers of initiating a volatile chemical reaction.

So what can the landscape tell us about features that are in poor shape, that are widely dispersed, have very little documentary or artifactual evidence attached to them and are generally dismissed as being unimportant? A considerable amount. These sites are “visible symbols of the process of production in both time and space”(Palmer and Neaverson 1998:43) which represents how a population interacted with both available information and raw materials (Hardesty 1988:1). The two most important elements of an archaeological approach, that of context and change can provide additional or even alternative viewpoints for these types of small industrial sites (Alfrey and Clarks 1993:113).

Lime kilns could be considered, as Palmer and Neaverson phrase it, an “expression of human endeavor” (1998:3). They relate to the types of homes people decided to build, the ways in which they used their newly acquired land, and the bigger social and economic changes in the settlements where these homesteaders lived (Alfrey and Clarks 1993:6,9). These are not isolated features. They are integral parts of linked networks (Palmer and Neaverson 1998:4), representing a flow of materials both coming to the site and leaving the site in a different, usable form (Gordon and Malone 1994:20).

Reading the landscape as if it were a document helps bring attention to small industrial sites which would have previously been considered of little interest due to their lack of documentary and artifactual evidence and often dilapidated appearance. I

argue that these sites should be considered a valued historical resource and given the respect they deserve as part of the archaeological record of western Canadian settlement history.

This research has demonstrated that lime kilns are a transplanted technology adapted to the topography and lack of infrastructure. They represent self sufficiency for an isolated population and the economic participation of early settlement communities. The products from these kilns directly influenced early settlement structures in Saskatchewan and very often the quality of the lime and the skill and knowledge of those who were familiar with its proper use has contributed a rich legacy of built heritage.

5.2 Future Work

The history of lime production is a fascinating one. Delving further into how the industry developed in Canada would provide a valuable glimpse both archaeologically and historically regarding the production of EuroCanadian commodities. Further, tracing the roots of lime burning in Canada back to their European origins will provide a more complete picture of the tradition as it developed regionally. This will also allow ties to specific architectural traditions to unfold as population movement occurred over the centuries. Taking a look at lime production from a broader, world-view would put its production in Saskatchewan in a clearer context.

Métis involvement in lime burning was known, and the resulting lime products used architecturally can still be seen on Métis- built structures from the early settlement period. It is however, difficult to find documentary information on who was burning lime, where and for what. There are many publications and journal articles dedicated to Métis vernacular architecture where the use of lime plaster and whitewash was mentioned, but none discuss how and where lime was produced. A series of oral interviews with elders within the Métis community, especially around the St. Laurent area may be helpful in discovering more about the early lime industry and the evolution Métis architectural traditions.

Interviewing elders on First Nations reserves that once produced lime may also provide more valuable information. An alternative view of the process of lime burning, the role of the Indian Agents as teachers and dictators of “proper sanitation” and the use of the final product architecturally in new sedentary homes on reserves would all be topics worth looking further into.

Ukrainian immigrants were heavy, seasonal users of lime, plastering and whitewashing both the exterior and interior of their log homes (Figure 5.5). Very little information was available regarding the production of lime among new Ukrainian immigrants although there is a wealth of information on the unique vernacular architectural traditions that transferred directly in form and function to Saskatchewan. It is generally believed that lime was purchased from elsewhere and not produced on Ukrainian homesteads (John Lehr personal communication, 2013).



Figure 5.5. Ukrainian home, west of Veregín, 1938 (Courtesy of the University of Saskatchewan, Special Collections, A.S. Morton photographs).

Scouring early surveyors diaries may reveal the locations of other, earlier lime kilns that were not found during the course of this research, specifically those that may have been operating prior to the earliest days of homesteading.

Additionally, the role the fur trade played in the production and use of lime would be worth researching more in depth. Those individuals involved with the fur trade were among the earliest Europeans to arrive in Saskatchewan and brought specific European architectural traditions with them. Most of these men were from the British Isles and we know many of the structures built in Canada which date from the fur trade era, especially those related to the Hudson Bay Company, reflect rules and details which were dictated from those in the British Isles and reinforced on site by those in charge.

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